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February 2007

Air Traffic Services Operations

Headquarters, Department of the Army

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Field Manual
FM 3-04.120

Headquarters
Department of the Army
Washington, D.C. 16 February 2007

Air Traffic Services Operations

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***This publication supersedes FM 1-120, 22 May 1995.**

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Preface

Field manual (FM) 3-04.120 serves as a doctrinal guide primarily intended for the Theater Airfield Operations Group (TAOG), Airfield Operations Battalion (AOB), and air traffic services (ATS) company commanders, subordinate leaders, and assigned personnel. It is applicable for use by the division, corps, Theater Aviation Command (TAC), Theater Support Command (TSC), as well as the Army aviation community including members of allied, coalition, special operations, and civil support forces requiring air traffic and airfield management support. It also assists Army branch schools and joint military services in teaching Army ATS operations.

Army transformation and future force development of ATS will enable the tailoring of ATS capabilities as well as embedding an airfield management capability at theater airfields. This manual describes structure, mission, employment and sustainment of ATS units supporting major combat, stability and civil support operations. It establishes responsibilities and duties of key personnel and discusses planning considerations required for training, operations, and combat. FM 3-04.120 is authoritative and prescriptive but is not inflexible. Situations in combat are resolved by the intelligent interpretation and application of this doctrine. Standardized ATS operations at division and theater level are necessary for the success of modularity, readiness, and effective maneuver support operations.

This FM applies to the Active Army, the Army National Guard/Army National Guard of the United States, the United States Army Reserve, and the Army civilian employees of the transformation force unless otherwise stated. FM 3-04.120 builds on collective knowledge and experience gained through recent operations, exercises, and the deliberate process of informed reasoning. Its principles and fundamentals address new technologies and evolving responses to diverse threats. It will also assist Army branch schools in teaching ATS operations.

The proponent of this publication is Headquarters, United States Army Training and Doctrine Command (TRADOC). Send comments and recommendations on Department of the Army (DA) Form 2028 (Recommended Changes to publications and Blank Forms) or automated link (http://www.usapa.army.mil/da2028/daform2028.asp) to Commander, United States Army Aviation Warfighting Center (USAAWC), ATTN: ATZQ-TD-D, Fort Rucker, Alabama 36362-5263. Comments may be e-mailed to the Directorate of Training and Doctrine (DOTD) at av.doctrine@us.army.mil. Other doctrinal information can be found on the Internet at Army Knowledge Online (AKO) or call defense switch network (DSN) 558-3551 or (334) 255-3551.

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

This publication has been reviewed for operations security considerations.

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Chapter 1
Organization and Missions

Over the last century, warfare became increasingly complex. Army organizations changed from large division sized organizations to today's brigade-based combined arms teams. To meet this challenge ATS organizations have undergone a transformation to better enable aviation to meet the requirements of the changing battlefront. ATS organizations are now designed to efficiently support Army aviation and joint, interagency, interdepartmental, and multinational (JIIM) forces. ATS organizations enable safe and efficient use of positive and procedural control measures with a designated airfield management structure managing high-density and congested airfields at theater level. The organizational tenets for this design are doctrinally balanced, logistically supportable, modernized, multifunctional, and modular.

OPERATIONAL FRAMEWORK

Contents

1-1. ATS organizations are an enabling component of the modular, scalable and tailored Army aviation force. Responsiveness requires a capability to support forcible and early entry contingency response and conduct simultaneous operations immediately on arrival. Air traffic operations are conducted overseas within contiguous and noncontiguous areas, throughout the spectrum of conflict, and during all phases of campaign themes. Air traffic organizations conduct civil support operations in response to natural or manmade disasters, accidents, and incidents within the United States and its territories.

1-2. ATS companies assigned to a combat aviation brigade (CAB) conduct operations as organizational elements of the general support aviation battalion (GSAB). This command relationship maximizes efficiency of operations, serving as a combat enabler for Army aviation and divisions. The company must be able to operate and complete its mission with the CAB or as a member of an aviation task force supporting JIIM forces. The company and its elements may operate within an aviation battalion task force in a direct support (DS) or general support (GS) role.

1-3. AOBs and TAOGs are additional ATS forces that support theater-level requirements. The AOBs have an airfield management element as well as air traffic personnel and equipment to execute airfield and air traffic responsibilities. One TAOG is capable of supporting five theater airfields as required. TAOGs and AOBs are deployed based on METT-TC and may operate from a single base, or conduct split-based operations in multiple locations within the theater of operations.

UNIT SUPPORT CAPABILITY

1-4. The ATS company, AOB, and TAOG must be prepared to support—

- Strategic deployment planning and execution.
- Administrative and tactical movements.
- Intelligence preparation of the battlefield (IPB).

- Employment of communications systems.
- Force protection/sustainment.

PLANNING

1-5. The ATS company, AOB, and TAOG headquarters must be able to simultaneously—

- Plan, prepare, execute, and assess current and future operations.
- Visualize, describe, and direct subordinate elements to accomplish missions.
- Protect and sustain their forces.

ENVIRONMENTS

1-6. All units must train for and accomplish operations under the following conditions:

- Near ground forces.
- Day or night.
- Under limited visibility (instrument meteorological conditions [IMCs] proficiency is critical).
- All environments such as desert; mountain; rolling hills; dense forest; jungle; plains; urban; hot, basic, cold and severe cold weather; and chemical, biological, radiological and nuclear (CBRN).

ORGANIZATION

AIR TRAFFIC SERVICES COMPANY

1-7. The ATS company (figure 1-1) is organic to the GSAB for training, safety, standardization, leader development and sustainment. It is inherently dependent on the GSAB for ground maintenance, logistics, personnel actions, feeding, health care, and other sustainment support services.

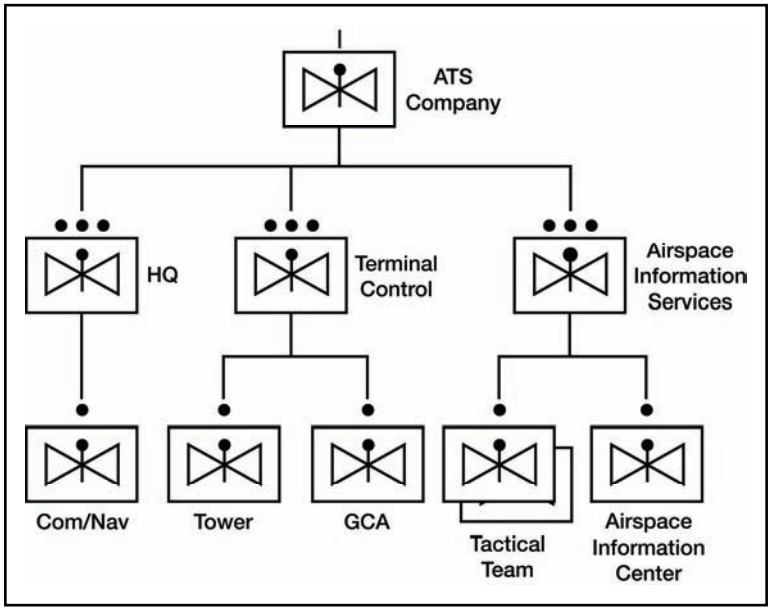


Figure 1-1. ATS company organizational chart

AIRFIELD OPERATIONS BATTALION

1-8. The AOB (figure 1-2) is composed of several staff and operational sections/platoons required for the management and execution airfield activities at designated airfields within the theater of operations. The AOB has organic ATS forces, airfield management headquarters, and sustainment personnel.

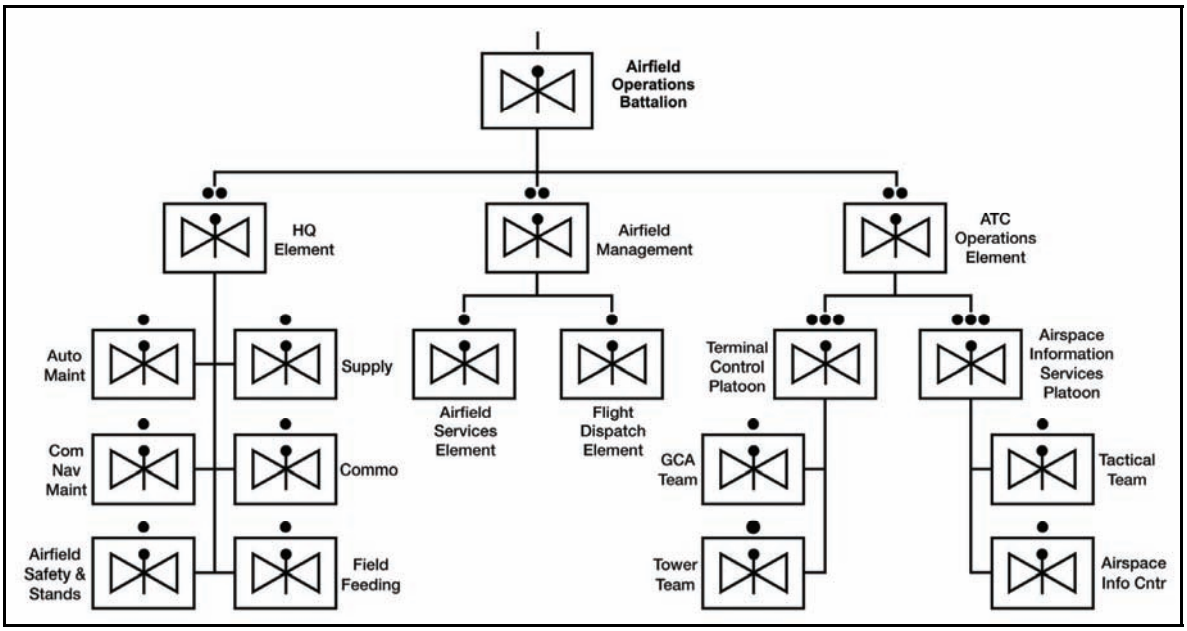


Figure 1-2. AOB organization

THEATER AIRFIELD OPERATIONS GROUP

1-9. The TAOG (figure 1-3) is organic to the theater aviation command. A TAOG consists of a headquarters and headquarters company (HHC), and five AOBs. The TAOG provides theater airfield command and control (C2), planning, and oversight throughout the theater of operations.

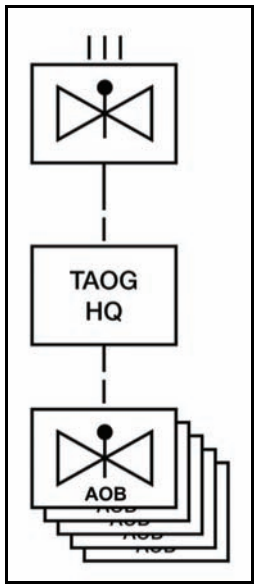


Figure 1-3. TAOG organization

1-10. Figure 1-4 depicts the TAOG headquarters organization.

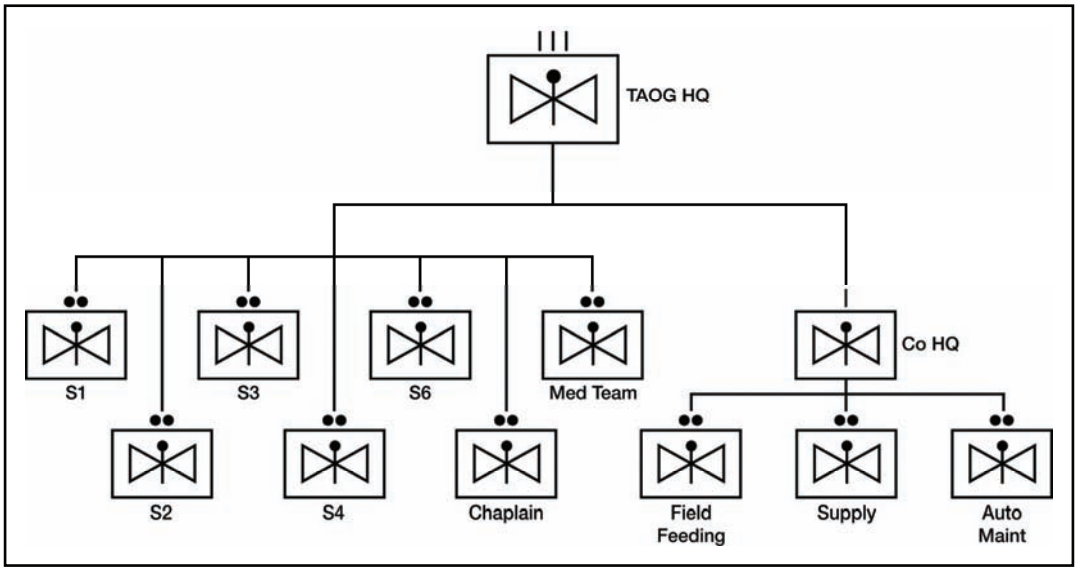


Figure 1-4. TAOG headquarters organization

MISSION AND SUPPORT CAPABILITIES

AIR TRAFFIC SERVICES COMPANY

1-11. An ATS company supports CABs by providing terminal area and en route airspace information and control services. ATS companies provide services to support CABs throughout full spectrum operations. ATS companies are composed of a control tower, ground control approach (GCA), airspace information center (AIC), and two tactical aviation control teams (TACTs). They also deploy as part of the CAB and are an integral part of the brigade's readiness.

1-12. ATS companies have the following capabilities:

- Deployable within 96 hours of notification, and are equipped and capable of operations in any environment.
- Control tower operations upon 30 minutes of arrival in an area of operation (AO) and become fully operational within 1 hour of arrival.
- Provide self-sustaining operations for 72 hours upon arrival in an AO.
- TACTs in austere/tactical environment operational 15 minutes after arrival in an AO.
- Support aircraft recovery operations including personnel recovery, medical evacuation (MEDEVAC), and assistance to aircraft in distress (battle damage, inclement weather, and disoriented aircraft).
- Provide airspace management operations in support of manned and unmanned air operations for its designated airspace sector by providing updates of airspace information.
- Provide navigational assistance to friendly aircraft.
- Coordinate air traffic control (ATC) procedures with military C2 agencies and civilian agencies/organizations, including the Federal Aviation Administration (FAA) and International Civil Aviation Organization (ICAO).
- Provide personnel for survey/reconnaissance party team; ensuring air traffic procedures, ATS equipment emplacement criteria, and terminal instrument procedures (TERPs) are considered and addressed during site survey.

- Provide personnel as required for integrated aviation planning and management of air operations.
- Provide precision and nonprecision navigational aids (NAVAIDs).
- Provide essential situational awareness (SA) information for use in activation and execution of the airfield base defense zone (BDZ).
- Provide ATS subject matter experts to assist with the CAB's mission area relating to the JIIM force.
- Provide ATS operations across the spectrum of conflict to include civil support and homeland security operations facilitating restoration, revitalization, stability, and sustainment services.

AIRFIELD OPERATIONS BATTALION

1-13. The AOB provides airfield management, base operations, and ATS services at designated airfields throughout the theater of operations. The battalion also provides battle command to other airfield service support assets. The AOB establishes an airspace information center for airspace management and interfaces with the theater airspace system.

1-14. The organizational design of the AOB does not include the associated equipment and personnel needed to provide a full range of airfield activities in support of aviation operations. An ATC operations element, airfield services element, safety/standardization section, and communication/navigation (COMNAV) maintenance section are organic to the AOB. Aircraft crash rescue; hazardous material handling; up and down loading of cargo; weather services; petroleum, oil, and lubricants (POL) section; and the base defense operations center (BDOC) are external support elements.

1-15. AOB has the following capabilities—

- Conducts airfield safety inspections.
- Develops local flying area/rules and hazards map.
- Transmits flight movement messages.
- Develops and coordinates the preaccident plan.
- Coordinates local flying rules on theater airspace.
- Provide personnel for survey/reconnaissance party team, ensuring air traffic procedures, ATS equipment emplacement criteria, and TERPs are considered and addressed during site survey.
- Aircraft fuel, refueling services.*
- Hazardous material handling.*
- Cargo up and down loading.*
- Force protection/security/quick reaction force (QRF).*
- Provides liaison with the airspace authority joint force air component commander (JFACC)/Combined Air Operations Center.
- Establishes airfield crash system and provides flight dispatch services.
- Processes/disseminates air tasking order (ATO)/airspace control order (ACO) and special instructions (SPINS) information.
- Provides weather service.*
- Processes ACM requests for terminal areas.
- Provides airspace common operating picture (COP).
- Establishes terminal ATS (tower and GCA).
- Establishes Airspace Information Centers.
- Interfaces with theater or corps command, control, and communications (C3) air on airspace, aviation procedures guide (APG), or heliport procedures guide.

Note: * Capabilities requiring augmentation.

THEATER AIRFIELD OPERATIONS GROUP

1-16. The mission of a TAOG is to provide oversight, technical expertise and standardization for its assigned AOBs. The TAOG executes theater airfield operations and synchronizes air traffic in a joint environment. It establishes theater airfields in support of reception, staging, onward movement, and integration (RSOI) requirements, seaport of debarkation (SPOD), aerial port of debarkation (APOD) and JIIM operations. The TAOG coordinates and integrates airspace use requirements with the Army airspace command and control (A2C2) element of the controlling headquarters. The TAOG coordinates and schedules flight checks, reviews and processes TERPs procedures, and provides quality assurance of controller, ATC maintenance, and flight operations training and certification programs. It also supports the Army Service Component Command (ASCC) on Title 10 ATS issues, liaison responsibilities with host nation airspace authority, and other United States and combined services and agencies.

1-17. The TAOG has the following capabilities:

- Develop and validate theater ATS force requirements.
- Interface with appropriate theater staff elements for the planning and execution of airfield and ATS mission sets.
- Reviewing and processing TERPs for terminal areas.
- Providing personnel for survey/reconnaissance party team, ensuring air traffic procedures, ATS equipment emplacement criteria, and TERPs are considered and addressed during site survey.
- Conduct flyability checks for theater NAVAIDs.
- Providing expertise to ASCC on Title 10, host nation, and ATS issues, including contract ATC and ATS systems support contractors.
- Coordinate and synchronize ATS field service representatives.
- Synchronize theater ATS maintenance efforts.
- Identify ATS equipment staging/reset requirements.
- Executing ATS liaison responsibilities as required by ASCC with host nation airspace authority and combined/joint air operations center.

Chapter 2

Command and Control

The C2 system is defined as the facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations. C2 is an essential element of the art and science of warfare. No single specialized function, by itself or combined with others, has a purpose without it. Although commanders are responsible for C2, it also applies to staff officers and noncommissioned officers (NCOs).

SECTION I – BATTLE COMMAND

Contents

2-1. Battle command incorporates three vital components: decision making, leadership, and control. Decision making entails knowing whether to decide, then when and what to decide. These judgments are tactical and operational, but can be strategic as well. Control is inherent in battle command; it monitors the status of organizational effectiveness and identifies deviations from standards. Control provides the means to regulate, synchronize, and monitor forces and functions. These tasks, performed through collection, fusion, assessment, and dissemination of information and data, allow commanders to lead from critical points on the battlefield, delegate authority, and synchronize unit actions with other battlefield operations. Skilled staffs work within command intent to direct and control units and resource allocations to support the desired end.

2-2. C2 gives commanders the structure and means to make decisions and evaluate developing situations. Units translate decisions and higher-level intent into productive actions by using information derived from the C2 process consisting of the following steps:

- Acquire information.
- Assess whether new actions are required.
- Determine what these actions should be.
- Direct subordinates to take appropriate actions.
- Supervise and assess.

2-3. Effective and efficient C2 begins and ends with the commander. The commander must develop techniques and procedures that promote an expeditious flow of information throughout the C2 process. These techniques and procedures should be in the unit's tactical standard operating procedures (SOPs). FM 6-0 and FM 1-02 provide techniques.

ORGANIZATION

2-4. How the commander organizes the C2 system can complicate or simplify execution. Organizing effectively requires commanders to apply the fundamental principles of organization for C2 and manage the staff for continuous C2. Organizational decisions establish the chain of command and task organization directly affecting C2. Each of these tenets can influence where commanders obtain facts, whom they rely on for advice, and how they supervise. Organizational decisions affect the flow of information to

commanders. In essence, organizations establish formal communication channels and determine how commanders distribute their forces.

2-5. Organization serves the important function of providing sources of group identity for Soldiers assigned to the command. A command operates most effectively when Soldiers consider themselves members of one or more groups characterized by high levels of loyalty, cooperation, morale, and commitment.

2-6. Information flows vertically within the chain of command, but an organization should not limit its flow to the chain of command. Information also must flow horizontally among adjacent, supported, and supporting units. Information flows informally and unofficially between individuals according to personal relationships, as well as within formal channels. Information channels provide important redundancy.

AIR TRAFFIC SERVICES COMMAND AND SUPPORT RELATIONSHIPS

Air Traffic Services Company

2-7. The ATS company is assigned to the GSAB within the aligned CAB. The ability of the ATS company to operate teams independently is paramount to mission success. Elements of the ATS company may be required to operate for short or extended periods separated from the main body of the company.

Airfield Operations Battalion

2-8. AOBs are assigned to the TAOG and operate in a GS role to the theater. An AOB deployed separately without a TAOG operates in a DS role to a geographical unit within the area of operation.

Theater Airfield Operations Group

2-9. The TAOG is assigned to the TAC. When deployed separately the TAOG may be under the operational control (OPCON) of the TSC.

SECTION II – COMMAND AND STAFF RESPONSIBILITIES

AIR TRAFFIC SERVICES COMPANY

COMPANY HEADQUARTERS

Commander

2-10. The company commander is a military occupational specialty (MOS) 15B aviation officer responsible for the command and integration of the unit with Army aviation or joint agencies. The commander provides critical flying expertise to the ATS mission set that better enables planning and execution of ATS. Unique responsibilities of the ATS commander include—

- Providing operational understanding of aircraft performance characteristics in establishing airspace and air traffic procedures.
- Integrating aircrew and aircraft training progression into the ATS collective training scheme.
- Evaluating ATS procedures and controller proficiency through routine flight assessments.

First Sergeant

2-11. The first sergeant (1SG) is an MOS 15P noncommissioned officer with an MOS 15Q ATC background. The ATS 1SG is the commander's primary advisor on enlisted Soldiers and provides unique operational experience in air traffic training, procedures, and air traffic regulation. Unique responsibilities of the ATS 1SG include—

- Monitoring air traffic training development, proficiency, and assignments.
- Identifying, planning, and assessing Soldier training tasks to support the performance of collective (unit) tasks of the mission essential task list (METL).

- Providing recommendations on ATS reclassification, medical suspensions, and flight fitness actions.

Platoon Leader

2-12. The platoon leader is an MOS 150A air traffic and airspace management technician warrant officer. He supervises employment of platoon personnel and equipment. The platoon leader also—

- Manages and supervises enlisted ATC personnel.
- Is thoroughly knowledgeable of procedures and standards for separation and control of manned and unmanned systems, airports, and airspace.
- Provides standardized training and quality assurance of certification programs.
- Reviews and revises TERPs packets and assists in the certification process of associated NAVAIDs and facilities.
- Assists in development and revision of controlled and special use airspace.
- Provides technical expertise on installation and operation of ATC equipment.
- Applies standards, time limitations, and policies for issuing controller qualification, certification, and facility ratings to ATC personnel.
- Applies procedures for cancellation, suspension or reissuance, and withdrawal of certificates and facility ratings.
- Provides ATS input for the development and revision of APGs.

Platoon Sergeant

2-13. The platoon sergeant is an MOS 15Q40 air traffic controller. The platoon sergeant is the primary assistant and advisor to the platoon leader concerning all aspects of operations, personnel, administration, ATS services, and equipment emplacement. The platoon sergeant may serve as an ATC specialist/control tower operator (CTO) examiner in accordance with Army regulation (AR) 95-2 and appropriate FAA Orders (FAAOs). The platoon sergeant assumes responsibilities of the platoon leader in his or her absence. As the lowest level NCO involved in company METLs, the platoon sergeant teaches collective and individual tasks to Soldiers assigned to the platoon.

2-14. Using tough, realistic, and intellectually and physically challenging performance-oriented training, the platoon sergeant ensures Army standards are met and maintained. Additionally, the platoon sergeant conducts cross training to promote critical wartime skills within the unit, evaluates the effectiveness of the platoon, and provides training feedback to the commander and 1SG during after-action reviews (AARs) on unit collective training.

COMMUNICATION/NAVIGATION MAINTENANCE SECTION

2-15. The COMNAV maintenance section, organic to the ATS company, consists of an ATC Systems Maintenance Supervisor and four equipment repairers. The ATC Systems Maintenance Supervisor is an MOS 94D30 NCO. The maintenance chief is responsible for coordinating field maintenance of ATS equipment assigned to the company.

TERMINAL CONTROL PLATOON

2-16. The terminal control platoon consists of a control tower team with nondirectional beacon (NDB) and a GCA team led by a platoon leader and platoon sergeant. This platoon is responsible for providing terminal control services to establish one airfield with associated precision and nonprecision approaches.

Control Tower Team

2-17. The control tower team is responsible for control of friendly aircraft operating within terminal airspace. This airspace is typically limited to an area visually observed and surveyed from the tower (approximately a 5-nautical mile radius from the center of the airfield with an altitude based on operational

need as determined by the airspace control authority). The control tower team is also responsible for air and vehicular traffic operating on runways, taxiways, and other designated areas of the airfield.

Control Tower Facility Chief

2-18. Responsibilities include—

- Coordinating the development of specific terminal airspace procedures peculiar to the airfield.
- Coordinating with military/civilian agencies to ensure tower ATC services are coordinated within the ATS plan for theater of operations.
- Managing training of all controllers assigned to the tower.
- Understanding and implementing the ACO and the airspace control plan (ACP).
- Resolving airspace conflicts within the terminal control area.
- Selecting the emplacement site for team equipment.
- Developing standard ingress/egress procedures for unmanned aircraft systems (UASs) operations.

Ground Control Approach Team

2-19. The GCA team provides IMC recovery capability to a single Army airfield, and airport surveillance radar (ASR) and precision approach radar (PAR) within designated airspace The GCA team normally operates in conjunction with a control tower team, with an NDB to form a fully instrumented airfield.

GCA Facility Chief

2-20. The GCA facility chief is responsible for—

- Conducting site surveys and collecting data used to initiate TERPs.
- Coordinating and assisting with flight inspection procedures/flyability checks.
- Coordinating development of specific GCA procedures particular to the airfield.
- Coordinating with other military/civilian agencies to ensure radar ATC services are coordinated within the ATS plan for theater of operations.
- Managing training of all controllers assigned to the GCA.
- Selecting emplacement site for team equipment.

AIRSPACE INFORMATION SERVICES PLATOON

2-21. The airspace information services (AIS) platoon leadership team consists of a platoon leader and platoon sergeant. An AIS platoon consists of an AIC team and two TACT teams. This platoon is responsible for providing flight following services through procedural and positive control means to aircraft operating within assigned airspace and visual flight rule (VFR) ATC services to remote sites landing zones (LZs), pickup zones (PZs), assembly areas (AAs), and forward arming and refueling points (FARPs).

Airspace Information Center

2-22. The AIC team provides flight following services to friendly aircraft operating within assigned airspace. The actual airspace assigned is dictated by the assigned mission and communications capabilities. Additionally, the AIC team displays the COP on the tactical airspace integration system (TAIS) as received from feeds from other battlefield automated systems (BASs) within the Army battle command system (ABCS) and battle command enablers system of systems. The AIC team monitors airspace users and ensures aircraft operate within the parameters of the ACO. The team coordinates emerging airspace requirements for current operations, broadcasts air and ground threats to participating aircraft, and maintains situational awareness of unmanned aerial systems within their area of responsibility.

AIC Facility Chief

2-23. The AIC facility chief is responsible for—

- Coordinating development of specific airspace information and flight coordination procedures specific to the assigned area of operations.
- Coordinating with other military/civilian agencies to ensure AIC services are coordinated within the ATS plan for theater of operations.
- Managing training of all controllers assigned to the AIC.
- Coordinating requirements to ensure data and communication links are established for connectivity to other ABCSs and ATC facilities.
- Developing an immediate airspace alert plan.
- Providing input into the ACO and ACP.
- Assisting in the establishment of procedures for aircraft operating in uncontrolled airspace within the division's AO.

Tactical Aviation Control Team

2-24. The TACT is trained and equipped to provide initial rapid response ATC, and C3 to support Army aviation and joint missions. Tactical tower teams support operations at LZs, PZs, AAs, and FARPs.

2-25. As a stand alone ATC capability, the TACT provides ATC services for airfield seizures, noncombatant evacuation operations, domestic or foreign humanitarian assistance operations, civil disturbance operations, and short duration Army aviation/joint operations.

2-26. The TACT rapidly establishes and controls LZs, which are temporary austere landing areas for rotary wing aircraft in remote locations. The TACT is trained and task organized to—

- Provide ATC services at designated LZs, including formulating ATC procedures, and issuing ATC clearances, instructions and advisories to effect safe, orderly, and expeditious movement of air traffic in their assigned airspace.
- Establish a terminal control area around each LZ and control all air traffic within this area under VFR conditions.
- Conduct LZ surveys to determine suitability of the landing surface for operations annotate hazards to aviation, including obstructions/obstacles, and to provide operational data.
- Mark and illuminate LZs for rotary wing operations.
- Provide nondirectional beacons.
- Coordinate with civil and military control agencies.
- Provide air-ground and air-to-air communications linking austere sites with higher and adjacent C2 agencies.
- Provide limited weather observations and information.
- Provide positive control of personnel and equipment within the AO.

Team Leader

2-27. Responsibilities of the tactical team leader include—

- Determining site selection for emplacement of team equipment.
- Supervising LZ/PZ marking in accordance with FM 3-21.38.
- Assisting in LZ/PZ/drop zone certification process.
- Participating in mission planning process with supported aviation unit.
- Providing input for required airspace coordination measures (ACMs).

AIRFIELD OPERATIONS BATTALION

HEADQUARTERS ELEMENT

Commander

2-28. The AOB commander is a MOS 15B aviation officer responsible for the integration of airfield activities with Army aviation or joint agencies. The AOB commander relies on his staff and subordinate leaders to advise and assist in planning and supervising operations. The AOB commander normally serves as the airfield commander and may be the senior airfield authority with the following duties and responsibilities:

- Holds command authority of the airfield and associated personnel.
- Directs planning meetings and provides input on issues affecting the airfield.
- Sets airfield policy and provides guidelines for the use of airfield property by tenant organizations (such as parking areas, hours of operation, airfield services, complaint procedures, and other operational agreements).
- Represents Army Aviation interests and coordinates Army Aviation requirements on joint-use airfields.

Air Traffic Control Operations NCO

2-29. The ATC operations NCO maintains general situational awareness of airfield activities and is overall responsible for airfield operations personnel. The ATC operations NCO conducts the following activities:

- Monitors training and ensures personnel are trained on the collective tasks of the unit's METL.
- Synchronizes airfield support activities.
- Coordinates unit movement and airfield occupation/operational-use areas.
- Executes policies and standards concerning enlisted performance, training, appearance, and conduct.
- Provides counsel and guidance to NCOs and other enlisted Soldiers.
- Coordinates airfield security operations, to include individual defensive positions of the battalion.

AIRFIELD MANAGEMENT HEADQUARTERS

Air Traffic Control Officer

2-30. The ATC officer is responsible for matters pertaining to operational employment, training, and mission execution of its headquarters and supporting elements. The ATC officer serves as the airfield manager and monitors daily airfield operations. Additionally, the ATC officer—

- Holds primary supervisory and management responsibility for the airfield.
- Publishes and synchronizes local flying rules with tenant aviation units.
- Attends planning meetings and provides input on issues affecting the airfield.
- Attends flight standardization committee meetings and provides input on issues affecting the airfield and local flying area.
- Establishes performance standards, procedures, and work priorities for airfield management and airfield operations personnel.
- Validates crash and rescue requirements in coordination with the aviation safety officer, medical personnel, firefighters, and other appropriate authorities.
- Maintains routine reporting and coordinates activities of liaison personnel.
- Ensures command, control, communications, computer, and intelligence (C4I) procedures are in place to resolve complexities posed by different communications systems.
- Maintains close coordination with the TAOG logistics (S-4) and personnel staff officer (S-1).

- Effects coordination with the area missile defense (AMD).
- Serves as the commander's representative on base defense operations cell counsel when required.

ATC Operations Chief

2-31. The ATC operations chief—

- Monitors training and ensures personnel are trained on the collective tasks of the unit's METL.
- Constructs airfield operating SOPs, letters of agreement, and operations letters.
- Conducts airfield inspections and checks.
- Monitors airfield emergencies and completes incident reports as required.
- Synchronizes airfield support activities.
- Coordinates airfield construction and improvement activities.
- Reviews airfield notice to airmen (NOTAMs).
- Maintains accountability of airfield equipment.
- Performs airfield noncommissioned officer in charge (NCOIC) duties.
- Supervises the flight dispatch section.

Airfield Safety and Standards Element

2-32. The airfield safety and standards element section develops and implements a comprehensive accident prevention program to minimize the risk of aviation operations. This element develops a pre-accident plan and works collaboratively with airfield services elements and the aviation community. Airfield safety and standardization personnel coordinate aircraft accident investigations, review operational hazard reports, and publish flight procedures in theater-specific APGs. Additional responsibilities include—

- Conducting initial and follow-up airfield safety inspections.
- Developing local airfield flight procedures and rules.
- Developing and ensuring currency of a local hazards map.
- Establishing the airfield crash system.
- Coordinating and securing additional assets as needed.
- Reviewing and processing TERPs package for completeness and accuracy.
- Scheduling flight inspections for NAVAIDs or radar approaches.

Airfield Safety Officer

2-33. The airfield safety officer (SO) is the commander's principal assistant during the risk management process and monitors all AOB missions to identify and address potential hazards. He recommends actions that permit mission accomplishment in the safest manner possible. The SO is responsible for the safety contents of the reading files. He is also a principal trainer and peer leader for company SOs. The airfield SO also—

- Represents the AOB commander on all safety-related matters.
- Performs duties outlined in AR 385-10, AR 385-40, AR 385-95, Department of the Army pamphlet (DA Pam) 385-40, and training circular (TC) 1-210.
- Investigates accidents or incidents involving aircraft or airfield personnel or equipment.
- Assists the ATC officer in writing the preaccident plan. (Appendix B discusses emergency plans and procedures.)
- Conducts airfield and safety inspections and advises airfield personnel on safety-related matters.
- Schedules and conducts safety meetings and advises the airfield commander of potential problem areas.
- Provides input to the local flying rules on safety-related matters.

Airfield Services Element

2-34. The airfield services element is composed of the following personnel.

Aviation Operations Sergeant

2-35. The aviation operations sergeant—

- Coordinates section activities under supervision of the ATC operations sergeant/officer.
- Supervises and trains aviation operations specialists.
- Serves as assistant airfield operations sergeant.
- Provides flight-planning service to include current publications, maps and charts, NOTAM displays, and weight and balance forms on each assigned Class 2 aircraft.
- Prepares work schedules for aviation operations specialists and ensures adequate coverage during peak periods.
- Ensures section SOP provides for immediate notification of the operations officer if an impending/actual emergency or operations security (OPSEC) violation occurs.
- Processes reports of unidentified flying objects (such as kites, balloons, model airplanes, and drones).
- Develops a training program for newly assigned operations personnel.
- Ensures airfield advisory procedures are established according to FAA Order (FAAO) 7110.10.
- Ensures ground personnel operating near or on taxiways or runways are thoroughly briefed on two-way radio communication procedures and are familiar with the ATC light signals in the Airman's Information Manual and FAAO 7110.65.
- Establishes and maintains a flight information publication (FLIP) account for the airfield according to AR 95-2 (contains information on the establishment and maintenance of a Department of Defense [DOD] FLIP account.).

Aviation Operations Specialist

2-36. The aviation operations specialist—

- Posts and disseminates NOTAMs.
- Transmits and records flight data.
- Advises local control tower on proposed departures and arrivals.
- Notifies operations sergeant when an arriving flight is overdue, as required by the local SOP.
- Notifies airfield services of estimated times of arrival and departure, ensuring timely servicing of aircraft.
- Notifies operations sergeant of arriving and departing very important persons (VIPs) for proper protocol procedures.
- Disseminates severe weather warnings to appropriate individuals or agencies according to the local SOP.
- Informs operations sergeant of any OPSEC violations.
- Inspects the airfield (including runways and taxiways) at least once during the shift for maintenance, police, OPSEC considerations and requirements, and foreign object damage (FOD).

Flight Dispatch Element

2-37. The flight dispatch element consists of two aviation operation sergeants. The flight dispatch element processes flight plans through the combat airspace system or host nation system. It develops and maintains local checklists, logs, and other required documentation to support functional area responsibilities. The element also provides flight planning services to include current publications, maps and charts, NOTAM displays, and weight and balance forms for Class 2 aircraft. Flight dispatch also develops local instructions for:

- Inbound and outbound aircraft.
- Distinguished visitors.

- Aircraft requiring special handling (such as air evacuation and hazardous cargo).
- Airfield restrictions (prior permission required).
- Crash alarm system.
- FLIP.
- In-flight advisories.
- FOD checks of the airfield at least once per shift.
- Providing advisory service in the event of ATC facility closure.
- A training program for newly assigned personnel.
- Ensuring airfield advisory procedures are established according to FAAO 7110.10.
- Ensuring ground personnel operating near or on taxiways or runways are briefed thoroughly on two-way radio communication procedures and are familiar with the ATC light signals in the Airman's Information Manual and FAAO 7110.65.
- Establishing and maintaining a FLIP account for the airfield according to AR 95-2. (AR 95-2 contains information on the establishment and maintenance of a DOD FLIP account.)

AIR TRAFFIC CONTROL OPERATIONS HEADQUARTERS

2-38. The coordination of ATC procedures and establishment of ATS is the responsibility of the terminal and airspace information services platoons. These elements provide detailed planning for terminal and airspace information services in and out of the area of responsibility (AOR) by developing aviation flight procedures and incorporating them into the theater airspace plan. ATC elements coordinate directly with the airfield management command group, other airfield services organizations, and force protection elements. The ATC operations element—

- Assists in the development of local airfield procedures.
- Develops the crash grid map used by airfield responding agencies.
- Develops the airfield diagram, and identifies/annotates crash response points.
- Assists in development and publication of the APG.
- Develops aircraft emergency procedures for both on and off the airfield.
- Coordinates, assists, and directs emergency crash rescue services.
- Develops ATC facility training manuals and programs for the airfield assigned. This ensures a comprehensive program of instruction for assigned air traffic controllers, enabling them to become FAA certified as CTOs or ATC specialists.
- Provides the CTO and/or ATC specialist examiners for those ATC facilities.
- Initiates the TERPs process if necessary or completes any portion of it to include an emergency recovery procedure in conjunction with tenet aviation unit's standards officer.
- Secures and disseminates the ATO/ACO and associated SPINS.
- Interfaces and coordinates with local AMD.

ATC Operations Officer

2-39. The ATC operations officer—

- Provides input to local flying rules on aircrew procedures (such as filing of flight plans; use of airfield services; joint use of airspace, airfield facility use, night operation agreements, noise abatement, nap-of-the-earth (NOE) training area rules; and other special interest areas). The input provided by the operations officer is aligned with input provided by the air traffic and airspace (AT&A) officer, ATC chief, and SO.
- Ensures air traffic control facilities are adequate and are operating within established policies.
- Develops a preaccident plan in cooperation with the ATC chief/senior sergeant, SO, airfield operations sergeant, flight operations sergeant, and personnel from responding agencies.
- Acts as AOB commander's representative to the BDOC.
- ATC Chief

2-40. The ATC chief—

- Supervises and manages all ATC facilities under his control at an airfield, heliport, or field site.
- Provides liaison on matters of ATC and airspace with the AT&A; DA representative; FAA; major Army commands; local post, camp, or station commander; and representatives of other units, agencies, or commands.
- Ensures ATC systems are operationally acceptable.
- Ensures facilities collect and safeguard data on aircraft mishaps, emergencies, or violations.
- Ensures assigned ATC personnel maintain currency.
- Ensures facilities conduct training and rating programs according to prescribed regulations.
- Ensures TERPs data collection and packets are complete and accurate in accordance with technical manual (TM) 95-226.
- May serve as ATC specialist/CTO examiner in accordance with AR 95-2 and appropriate FAA orders.
- Provides input to the local flying rules on ATC-related matters.
- Writes operations letters (OLs), letters of agreement (LOAs), and letters of procedure (LOPs) between ATC, flight operations, and the weather section. These letters establish working agreements between ATC, flight dispatch section, weather section, and other sections with clear delineation of authority and responsibility.

Note: Refer to ATS company section above for AOB communication/navigation maintenance section, and terminal and AIS platoon duties and responsibilities.

THEATER AIRFIELD OPERATION GROUP

COMMAND SECTION

Commander

2-41. The TAOG commander commands, controls, and leads the TAOG. The group commander is responsible for the outcome of his force's combat actions. The variety and impact of tasks confronting the TAOG commander are unique. Although he commands a brigade-level organization, his focus of employment is at theater level. These tasks require the cooperation of many people and integration of complex systems spanning the joint community. The TAOG commander C2s organic, assigned, or attached forces. These forces must be task-organized to accomplish all specified and implied tasks. The TAOG commander is responsible for—

- Analyzing and defining the mission and directing its execution, as well as issuing mission-oriented orders detailing the priority of tasks.
- Advising senior commanders and providing necessary advice in developing the campaign plan by analyzing the long-term aspects of TAOG employment. The TAOG commander ensures plans and orders are in concert with senior commander intent.
- Controlling ongoing operations and providing guidance for planning future operations.
- Assessing staff capabilities and limitations, and training them to execute in his/her absence.
- Developing and directing a safety and standardization program for peacetime and combat.

Executive Officer

2-42. The executive officer (XO) is the principal assistant to the commander. The scope of the XO's duties is often tailored by the requirements of the commander. The XO directs, supervises, and ensures coordination of staff work and logistics, except in those specific areas reserved by the commander. The XO is responsible for—

- Disciplining the staff's work and providing quality control.

- Understanding commander guidance and intent.
- Ensuring the staff has information, guidance from the commander, and the required facilities.
- Determining timelines for the staff, establishing back-brief times and locations, enforcing the information management plan, and providing instructions to guide the staff in the military decision making process.
- Issuing guidance and participating in formal and informal briefings.
- Supervising logistics operations and ensuring the sustainment effort.
- Staying current on the tactical situation in preparation to assume command.

2-43. As staff coordinator and supervisor, the XO—

- Formulates and announces staff operating policies affecting the command.
- Ensures the commander and staff are informed.
- Supervises main command post (CP) operations.
- Ensures execution of staff tasks and the coordinated efforts of staff members.
- Ensures the staff performs as a team by assigning specific responsibilities.
- Transmits commander decisions to the staff and subordinate commanders, when applicable. Staff members can deal directly with the commander; however, they are obligated to inform the XO of the commander's instructions or requirements.
- Establishes and monitors liaison and liaison activities.
- Supervises the information program.
- Serves as the materiel readiness officer.

Command Sergeant Major

2-44. The command sergeant major (CSM) acts in the name of the commander and is his primary advisor regarding enlisted Soldiers. The CSM focuses attention on functions critical to the success of the operation. The CSM assists the commander by—

- Monitoring NCO development, promotions, and assignments.
- Identifying, planning, and assessing Soldier training tasks to support the performance of collective (unit) tasks on the METL.
- Monitoring subordinate unit morale.
- Providing recommendations and expediting procurement and preparation of enlisted replacements for subordinate units.
- Monitoring food service and other logistics operations.
- Undertaking informal investigations.
- Assisting in controlling group movements.
- Leading the advance or quartering party during a major movement, coordinating closely with the HHC commander.
- Performing specific missions as directed by the commander.

Chaplain

2-45. The TAOG chaplain provides unit level religious support to all assigned or attached personnel, including nondenominational coverage and ministry for mass casualties/hospitalized members. The chaplain advises the commander on religious, moral, and Soldier welfare and morale issues. He establishes liaison with unit ministry teams (UMTs) of higher and adjacent units. The chaplain and chaplain's assistant compose the UMT, usually operating from the same location as the S-1.

Medical Treatment Team

2-46. The medical treatment team provides unit-level health support service (HSS) for the TAOG HHC, and medical oversight for subordinate units. The medical treatment team also provides emergency medical treatment, advanced trauma management, and routine sick call services.

Physican Assistant

2-47. The TAOG physician assistant advises and assists commanders on matters concerning the medical condition of the command, including preventive, curative, and restorative care. The physician assistant conducts flight physicals for unit personnel. He determines requirements for requisition, procurement, storage, maintenance, distribution, management, and documentation of medical equipment and supplies for the HHC. The physician assistant also operates the TAOG aid station normally located in the AA.

COORDINATING STAFF

2-48. The coordinating staff is composed of the commander's principle assistants responsible for one or a combination of broad fields of interest (personnel, intelligence, operations, logistics, planning, and communications). Coordinating staff members assist the commander in the supervision and execution of plans, operations, and activities. Collectively, through the XO, they are accountable for the commander's entire field of responsibility.

Human Resourse Section

2-49. The S-1 leads the personnel section by coordinating responsibility for finance, religious activities, public affairs, and legal services support for the unit. The S-1 section is normally collocated with the S-4 in the main CP. The S-1 section is responsible for—

- Human resources matters, including personnel readiness and services.
- Personnel strength and replacement.
- Coordinating with the flight surgeon to plan health services.
- Morale support activities and legal, financial, and postal services.
- Managing the awards program.
- Overseeing administration of discipline, law, and order with the provost marshal (if present) and brigade judge advocate.
- Providing casualty operations management.

Intelligence Section

2-50. The intelligence officer (S-2)/operations officer (S-3) leads the intelligence section, including the tactical CP team. The S-2 is responsible for intelligence, surveillance, and reconnaissance. He provides current information and analyzed intelligence for tactical value regarding terrain, weather, and the enemy.

2-51. The S-2 section provides combat intelligence, which includes collecting and processing information. This section prepares intelligence collection plans; receives and analyzes battlefield information; disseminates intelligence products; and provides up-to-date intelligence information to assist in planning for and coordinating close and rear battle operations. The S-2 staff section also:

- Coordinates intelligence activities.
- Converts the information requirements of the commander into the command critical information report.
- Facilitates the IPB process.
- Assists development of the deployment support team.
- Frequently updates the commander and staff on the enemy situation.
- Maintains isolated personnel reports.

Operations Section

2-52. The S-3/S-2 is responsible for the organization, employment, training, and operations of the TAOG and its supporting elements. The S-3 plans, organizes, and supervises unit training and integrates supporting elements. The S-3 monitors the battle, ensures necessary maneuver support assets are provided, and anticipates developing situations.

2-53. The operations section provides planning and task organization of brigade elements for combat operations, including personnel recovery. The S-3 section maintains routine reporting, coordinates the activities of liaison personnel, and plans proactively. The S-3 section, through the communications-electronics section (S-6), ensures procedures are in place to resolve complexities posed by different communications systems, ABCS, and connectivity. The S-3 section maintains close coordination with the S-4 and S-1 for TAOG logistics and personnel status.

Chemical Officer

2-54. The chemical officer advises the commander on CBRN operations, decontamination, smoke, obscurants, and flame. The chemical officer works directly for the S-3 and integrates CBRN into all aspects of operations. The chemical officer may have other S-3 section responsibilities and can act as an assistant S-3 or battle captain when directed.

Chemical Noncommissioned Officer

2-55. The chemical NCO provides advice to the commander and staff on CBRN defense matters, decontamination, equipment maintenance, CBRN reconnaissance, and support contingency requirements.

Airspace Management Officer

2-56. The airspace management officer serves as AT&A officer of units whose mission impacts the national airspace or host national airspace. The AT&A officer—

- Represents the airfield commander on all airspace-related matters. Examples include joint-use airspace, special-use airspace, altitude restrictions, restricted areas, range restrictions, training areas, areas of overlapping control for ATC purposes, and joint service agreements.
- Provides input to local flying rules on airspace-related matters.
- Maintains liaison with local FAA and/or host government agencies.

Air Traffic Control Officer

2-57. The ATC officer—

- Advises subordinate units on local flying rules on aircrew procedures (such as filing of flight plans, use of airfield services and facilities, joint use of airspace, night operations agreements, noise abatement, NOE training area rules, and special interest areas). Input provided by the operations officer is aligned with that provided by the AT&A officer, ATC chief, and SO.
- Compiles airfield information from subordinate units for theater APG publication and dissemination.
- Ensures airfield facilities are adequate and kept in good repair.
- Assists subordinate units with development of JIIM and host nation agreements.
- Ensures submission and dissemination of airfield NOTAMs.
- Interfaces with division, corps, Army A2C2 elements and appropriate joint element when supporting another service.

Air Traffic and Airspace Management Technician

2-58. The air traffic and airspace management technician (ATASM) is a MOS 150A warrant officer with a thorough knowledge of procedures and standards for the separation and control of aircraft, airports, and airspace. The ATASM—

- Reviews, revises, and processes TERPs packets; schedules flight inspections, and assists in the certification process of associated NAVAIDs and facilities.
- Assists in the development and revision of control zones, restricted areas, transition areas, and other special use airspace.
- Serves as the air traffic and airspace representative during the initial planning phases of missions and exercises.

- Serves as the standardization officer in the TAOG air traffic and airspace standardization office.
- Serves as the airspace subject matter expert for ATC operations/airspace during the establishment of corps, theater airfields.
- Provides guidance, advice, and counsel to commanders and staff members.
- Analyzes Army ATC/aviation accidents to assist determining causative factors.
- Performs the functions of the ATS standardization officer in the S-3 staff.
- Serves as assistant principle staff officer for all matters concerning training, operations and plans, and force development and modernization.
- Provides technical assistance on airfield and airspace matters; initiates recommendations for modifications and elaborations on policy and procedures; provides guidance, advice, and counsel to commanders and staff members.
- Provides guidance and technical input to subordinate ATC element and other staff elements and commanders at all levels.
- Provides operational guidance and technical input to joint interface control officers to ensure ATS requirements are coordinated for tactical data information links (TADILs) and the operational tasking data link.
- Provides technical subject matter expertise for networking and command, control, communications, computers, intelligence, surveillance, and reconnaissance connectivity, troubleshooting, and system administration in coordination with the TAOG signal support systems chief and supported unit S-6/general staff communications-electronics officer personnel.

Air Traffic Control Operations Chief

2-59. The ATC operations chief—

- Supervises all ATC activities on and around the airfield, including notifying the flight operations branch of outages in navigational or communication systems so aircrews operating in the area can be informed.
- Provides input to local flying rules on ATC-related matters.
- Writes OLs, LOAs, and LOPs between ATC, flight operations, and the weather section. These letters establish working agreements when clear delineation of authority and responsibility is required.

Air Traffic Services Standardization Element

2-60. The air traffic services standardization element (ATSSE) is a unique organizational design of the TAOG. This section provides oversight, technical expertise, standardization to Army airfields at theater level and quality assurance for training and certification of controllers and ATS maintenance personnel. It develops special use airspace for restricted areas, transition areas and control zones. The ATSSE serves as the primary staff coordinator for ATS matters within the theater area. The element is capable of splitting into two teams, with the warrant officer and NCOIC serving respectively as supervisors of one team each. Two teams are included for modularity and support of five AOBs employed across a wide geographical area throughout the theater.

Safety Officer

2-61. See AOB safety officer section above for duties and responsibilities.

Logistics Section

2-62. The S-4 provides supervision and coordination of food service, supply, transportation, and maintenance support for the TAOG. S-4 section responsibilities include—

- Recommending basic loads and supply requirements.
- Recommending the ammunition required supply rate to the S-3.

- Coordinating all classes of supply (except class VIII).
- Coordinating equipment recovery, evacuation, and repair.
- Conducting planning for operational movement control and mode and terminal operations.
- Coordinating with the civil affairs cell for host nation support.
- Coordinating services including water purification, mortuary affairs, aerial resupply, laundry, and shower.
- Coordinating battlefield procurement and contracting.

Communications-Electronics Section

Signal Support Systems Chief

2-63. The S-6 support systems chief manages personnel and equipment assets associated with the operation and internetworking of signal communication systems, automated information systems BASs, and tactical internet (TI). Systems include combat net radio, tactical message service, tactical operations center local area networks, area command user system, ABCS, and enhanced position location reporting system (EPLRS). The S-6—

- Integrates unit signal systems into signal corps wide area network.
- Develops and supervises the unit-level maintenance program for signal equipment and associated commercial off-the-shelf electronic devices.
- Manages installation and operation of radio retransmission and data distribution systems.
- Provides training and technical assistance to users of automation and communication equipment.
- Implements information systems security training plans (levels 1 through 4).
- Conducts automated information systems security inspections.
- Prepares and evaluates the automated information systems accreditation plan and documentation.
- Supervises operation of communications security (COMSEC) inventory control facilities and manages COMSEC procurement actions.
- Supervises personnel operating COMSEC equipment.
- Implements procedures for detecting and reporting COMSEC security threats.
- Directs setup of a personal computer for stand alone operation.
- Diagnoses BAS/automated information systems malfunctioning components and directs necessary corrective action.
- Implements a tactical intranet/web at brigade and below.
- Implements a tactical video teleconferencing system at brigade and below.
- Performs systems administration of tactical BAS/automated information systems and network administration of tactical BAS/automated information systems at brigade and below.
- Provides technical assistance to subordinate elements.

SECTION III – COMMUNICATIONS EQUIPMENT

COMMUNICATION SYSTEMS

2-64. The primary means of communications within the ATS companies/AOBs are very high frequency (VHF)-frequency modulation (FM) and wire (table 2-1). The companies also require high frequency (HF), satellite communication (SATCOM), and local area network (LAN) to interface with the digital battlefield for situational awareness (SA) battle command and to execute ATC/airspace coordination tasks.

Table 2-1. Current radio communication systems

Ultra high frequency (UHF)-amplitude modulated (AM) (line of sight [LOS])	
AN/ARC 164 Have Quick II	UHF-AM radio used by military aircraft & units requiring ground-to-air and ground-to-ground communications. Allows subordinate units to communicate internally on AOB nets. Permits interface with sister-service aircraft during joint air attack team and other joint operations; frequency-hopping mode counters enemy jamming efforts. Line of sight (LOS) system with limited range at terrain-flight altitudes.
AN/VRC 83(V)	UHF/VHF radio used by ground units requiring UHF & VHF capabilities. Provides AOB vehicle mounted UHF/VHF capability to communicate with aircraft and ground stations.
AN/PSC-5	Enhanced manpack ultra high frequency terminal, also known as SPITFIRE, is a man-portable demand assigned multiple access (DAMA), LOS and tactical SATCOM terminal. Utilized to communicate with single-channel ground and airborne radio system (SINCGARS) and Have Quick II in LOS modes, & for SATCOM utilizing DAMA & UHF for narrow-band SATCOM non-line of sight (NLOS).
AN/VSQ-2(V)4	EPLRS vehicular configuration used to communicate with and track forces on the battlefield. EPLRS provides the functions of data distribution & position location and reporting.
VHF-AM (LOS)	
AN/ARC-186(V)	Used to communicate with ATS in the amplitude modulated (AM). Operates in 116 to 151.975 VHF-AM frequency range & can back up SINCGARS radio in the same 30 to 89.975 MHz frequency range. Lacks a KY-58 interface providing secure FMFM communications, & has no frequency-hopping mode compatible with SINCGARS. Limited range at terrain-flight altitudes but has greater range at higher altitudes associated with ATS communication.
AN/URC-200	Used for military ATC operations. Capable of VHF-AM and FM operation modes.
HF (NLOS)	
AN/ARC-220(V)1	Replacing the AN/ARC-100, a long-range radio system providing voice & data communication beyond the range of SINCGARS & Have Quick II. Operates in 2 to 29.999-MHz frequency range in 100-Hz steps on 20 pre-selectable channels, for a total of 280,000 possible frequencies. NLOS range is at least 300 km. The 30 to 100 km range is often the most challenging distance to maintain effective communications.
95S-1A	A high performance receiver used in narrow-band radio frequencies. Equipment is rack-mounted & allows units to communicate on standard HF, VHF & ultra high frequency (UHF) bands (AM, FM, morse code, and upper, lower, and independent side brands).
VHF-FM	
SINCGARS	Used to communicate in the FM band Can be manpack or vehicle mounted. Allow for tactical LOS communications. Capable of plain text, cipher, and frequency hopping. Includes the AN/VRC-89F(C), AN/VRC-90F(C), AN/VRC 91F, AN/VRC-92D, AN/VRC-92F(C), RT-1476/ARC-201(V) & the AN/PRC-119F(C). Characteristics are:
	• VHF-FM frequency range of 30.000 to 87.975 MHz at 25-KHz intervals. • Secure electronic warfare resistant voice and data communications. • Utilizes frequency hopping. • LOS communications; limited range on ground or at terrain flight altitudes. • Requires KY-58 for cipher text communications. • Operates in single channel mode for interoperability with older radios. • Provides a digital communications link with the internet controller (INC) for the TI.

Table 2-1. Current radio communication systems

Single-channel ground and airborne radio system -system improvement program (SINCGARS-SIP)	Provides the commander with secure or plain voice communications, C2 of unit vehicles and aircraft, and interface with TI for EPLRS. SINCGARS-SIP characteristics are: • SINCGARS characteristics; embedded encryption; and automated global positioning system (GPS) interface. • Improved data capability for faster data communications. • Used with TI to support Army digitization of the battlefield. • Incorporates forward error correction, higher data rates, packet technology, and INC.
Multi-Band (LOS, NLOS, & Satellite)	
AN/PRC-117F(C)	Utilized across the spectrum of bands VHF, UHF, & UHF SATCOM; and to communicate ground-to-air & ground-to-ground. Provides voice and data modes of communication.

COMMAND AND CONTROL NETS

AIR TRAFFIC SERVICES COMMAND NET ARCHITECTURE

Purpose

2-65. The means to communicate is paramount to success on the battlefield. Members of the company must understand to whom they communicate, by what means, and why. Commanders must be aware of what information should be sent to and received from those individuals outside the company, allowing the company to operate and conduct the required mission load. Communication is vital to the aviation planning and execution phases. This is reviewed after every mission to ensure proper procedures were followed and modifications emplaced as necessary. Several means of communications are standard to the company, including digital, analog, messenger, hand and arm signals, and symbols.

Responsibilities

2-66. All levels of command establish and maintain communications with necessary headquarters and personnel. Communications methods and procedures must be established in unit SOPs and practiced during battle drills and flight operations. Traditional communications responsibilities are—

- **Higher to lower**. The higher unit establishes and maintains communications with a lower unit. An attached unit of any size is considered lower to the command to which it is attached.
- **Supporting to supported**. A supporting unit establishes and maintains communications with the supported unit.
- **Reinforcing to reinforced.** A reinforcing unit establishes and maintains communications with the reinforced unit.
- **Passage of lines**. During passage of lines (forward, rearward or lateral), the passing unit establishes initial contact with the stationary unit. However, the primary flow of information must be from the unit in contact.
- **Lateral communications**. Establishing communications between adjacent units may be fixed by the next higher commander, by order, or by SOP. If responsibility is not fixed, the commander of the unit to the left facing the enemy on a linear battlefield establishes communications with the unit on the right.
- **Rear to front communications.** A unit positioned behind another unit establishes communications with the forward unit.

2-67. Regardless of cause, all units take prompt action to restore lost communications. Methods of restoring communications must be established in the unit SOP and practiced during battle drills and daily flight operations.

2-68. The company commander ensures all unit personnel are properly trained and equipment is operational before deployment. Additionally, standard set-up and proficiency in procedures must be in place and practiced before deployment. This ensures maximum effectiveness and efficiency of the company's austere communications system.

Company/AOB Communications

2-69. The primary means of communication within the ATS company/AOB are radios and wire (table 2-2). The company and AOB also require SATCOM and LAN capabilities to interface with the emerging digital battlefield. AOBs/companies may use these radios for SA and to communicate with higher and lower echelons and ATS systems.

Table 2-2. Company/AOB communications connectivity

Company/AOB Headquarters	*TAC Tower*
Company/AOB to:	***TACT to:***
• Company/AOB/battalion/brigade/JIIM/TAOG : Wire, LAN,VHF-FM, HF-single side band (SSB) automatic link establishment (ALE). • TAC teams: VHF-FM, HF-SSB ALE, SATCOM-DAMA, wire. • GCA team: VHF-FM, wire. • Outposts/company area: Wire. • Terminal/AIS platoon: VHF-FM, LAN, wire. • AIC/Control tower team: VHF-FM, LAN, wire, SATCOM-DAMA. • BDOC: VHF-FM, LAN, wire. • Airfield operations: VHF-FM, LAN, wire.	• Company/battalion/brigade/JIIM: VHF-FM, wire, LAN, SATCOM-DAMA, HF-SSB ALE. • Aircraft: UHF-AM, VHF-AM, VHF-FM, HF-SSB ALE, SATCOM-DAMA. • Weather: VHF-FM, HF-SSB ALE, SATCOM-DAMA. • Control tower team: VHF-FM, HF-SSB ALE, SATCOM-DAMA. • GCA team: VHF-FM. • AIC team: VHF-FM, HF-SSB ALE, SATCOM-DAMA.
Control Tower to:	***GCA to:***
• Company/battalion/brigade/JIIM: VHF-FM, HF-SSB ALE, SATCOM-DAMA, LAN, wire. • GCA team: VHF-FM, wire. • TACT: VHF-FM, HF-SSB ALE, SATCOM-DAMA. • Airfield operations: VHF-AM, VHF-FM, LAN, wire. • BDOC: VHF-FM, LAN, wire. • AIC team: VHF-FM, HF-SSB ALE SATCOM-DAMA, LAN, wire. • Battle command server: LAN. • Weather: VHF-FM, LAN, wire. • Civil ATC: LAN, wire, commercial lines. • Aircraft: UHF-AM, VHF-AM, VHF-FMFM, HF-SSB ALE, SATCOM-DAMA.	• Company/battalion/brigade/JIIM: VHF-FM, wire. • Control tower team: VHF-FM, wire. • TACT: VHF-FM. • Weather: VHF-FM. • Aircraft : UHF-AM,VHF-AM,VHF-FM. • Civil ATC: wire, commercial lines. • AIC team: VHF-FM, wire. • BDOC: VHF-FM, LAN, wire.

Table 2-2. Company/AOB communications connectivity

Company/AOB Headquarters	*TAC Tower*
AIC to:	***Airfield Management to:***
• Company, battalion/brigade, JIIM: VHF-FM, HF-SSB ALE, SATCOM DAMA, LAN, wire. • Aircraft: VHF-FMFM, UHF-AM, VHF-AM, HF-SSB ALE, SATCOM-DAMA. • AWACS: TADIL A/J, (HF, UHF, SATCOM). • Air defense system integrator: TADIL A (HF, UHF), TADIL B, (LAN, wire), TADIL J (SATCOM, LAN, wire). • Civil ATC: LAN, wire, commercial lines. • High to medium air defense: TADIL B (LAN, wire). • Battle command server: LAN. • BDOC: VHF-FM, LAN, wire. • Weather: VHF-FM, HF-SSB ALE, SATCOM-DAMA, LAN, wire. • GCA team: VHF-FM, LAN, wire. • Control tower: VHF-FM, HF-SSB ALE, SATCOM-DAMA, LAN, wire. • TACT: VHF-FM, HF-SSB ALE, SATCOM-DAMA. • Upper TI: Joint network node (JNN)	• AOB headquarters, battalion/brigade, JIIM: VHF-FM, HF-SSB ALE, SATCOM-DAMA, LAN, wire. • Airfield operations/services: VHF- FM, VHF-AM, LAN, wire. • Control tower team: VHF- FM, VHF-AM, LAN, wire. • Battle command server: LAN. • Weather: VHF-FM, LAN, wire. • Aircraft : VHF-FMFM,VHF-AM, UHF-AM, HF-SSB ALE, SATCOM-DAMA. • Civil ATC: LAN, wire, commercial lines. • BDOC: FM, LAN, wire.

Digital

Force XXI Battle Command Brigade and Below

2-70. Force XXI Battle Command Brigade and Below (FBCB2) is the battle command information system for units operating at tactical level. FBCB2 communications are supported by the lower TI and warfighter information network-terrestrial. Digital communications connectivity for FBCB2 SA and lower TI C2 data for brigade and below has four primary components:

- EPLRS: data-only communication (platform position and network coordination).
- SINCGARS: voice and data communications.
- INC: routing and interface capability.
- Blue Force Tracker (BFT): component of FBCB2 system.

Enhanced Positioning Location and Reporting System

2-71. EPLRS is the backbone of company TI; however, not all platforms are equipped with EPLRS. Other platforms in the company transmit FBCB2 data through the single-channel ground and airborne radio-advanced system improvement program radio to EPLRS radios.

2-72. EPLRS (surface vehicle radio set/AN/VSQ-2[V]) provides the ability to enhance C3 capabilities. EPLRS provides a computer controlled communications network that transmits digital information to support tactical operations on the battlefield. Due to real-time unit positioning data supplied by EPLRS, accurate battle management capability increases, which allows the battle commander to not only move forces forward but to quickly and accurately counter opposition moves. EPLRS provides the commander with—

- Position location of unit forces.
- Navigation, reporting, and friendly identification.

- Dynamic representation of the forward line of own troops (FLOT).
- Situation reports on adjacent units.
- Situational understanding (SU).

2-73. EPLRS consists of a digital radio that—

- Provides secure, electronic warfare resistant data communications (non-voice).
- Provides C2 digital messaging at brigade and below with on-the-move, high-speed, automated data exchange for FBCB2 over the TI.
- Performs data distribution and near real-time position location and reporting in support of friendly 'blue" SU.
- LOS (UHF band).

Blue Force Tracker

2-74. BFT is an efficient tool to assist the commander with SA, airspace deconfliction, and C2. As a C2 tool, BFT allows the commander to track asset locations and provides an alternative means of over-the-horizon communications to meet this challenge. It also fills the communications gap by providing the capability of passing text messages between stations. Code words and similar short text transmissions are easily passed to supplement, or even replace, radio calls.

2-75. In planning, BFT enhances C2 by enabling the COP to be readily shared between headquarters, vehicles, and aircraft. Graphic control measures such as PZs, flight routes; restricted operations areas, LZs, and fire support coordinating measures (FSCMs) can be developed, plotted, and shared with other BFT-equipped units as a computer-graphics overlay file. These graphics can be downloaded to each BFT station, whether stationary or aircraft/vehicle-mounted, to enable viewing by crews.

Joint Network Tactical Capability System

2-76. The Army's joint network tactical capability (JNTC) system is made up of two major components: the JNN found at brigade and higher levels and the battalion level CPs module allocated to battalion level CPs. The joint network tactical capability system architecture has three main components: hub node, JNN, and battalion level node.

2-77. The division hub, which could be GS to the aviation brigade, consists of one 3.7-meter satellite dish transmitting 40 to 50 microbursts per second (mbps) bandwidth and supporting 16 time division multiple access (TDMA) nets via six frequency division multiple access links.

The JNN's tactical LAN encryptor, KIV-7 and KIV-19 Type 1 encryption can support:

- 48 two-wire phone users (secure internet protocol router [SIPR] and nonsecure internet protocol router [NIPR]).
- 24 internet protocol voice users (SIPR and NIPR).
- 46 internet protocol data users (SIPR and NIPR) (includes 24 data users connected to internet protocol phones).
- Hosts H.323 video conferences and is compatible with the defense collaborative tool suite.

2-78. The battalion level or small CP node module is a high mobility multi-purpose wheeled vehicle (HMMWV) mounted system with a trailer-mounted 2.4-meter satellite dish. The module contains a transit cased virtual private network router and tactical LAN encryptor security device and provides hub routers for CP and voice over internet protocol (VoIP) phones along with a file server. The battalion level CP module provides 4-mbps wideband secure internet protocol router network (SIPRNET) data along with VoIP phones to the aviation battalions and links to the JNN through TDMA satellite architecture.

2-79. For unclassified data traffic and interfaces to commercial internet, JNTC utilizes links to the DOD's unclassified but sensitive internet protocol routing system (NIPRNET). NIPRNET provides for a trusted interface between the DOD intra-net to commercial internet systems and the World Wide Web through Department of Defense Information Systems Agency designed and maintained demilitarized zone.

2-80. JNTC can provide a link to the DOD's SIPRNET. SIPRNET is a worldwide network which allows a secure means to transmit classified data, imagery, and video teleconferencing. SIPRNET can only be accessed by designated secure terminals, and is also available via AKO.

Analog

Wire

2-81. Wire is used for communications within the CP, AA, and support area. It is the primary and most secure means of communication whenever situations permit. Initially, wire is laid on the ground; when time permits, it is buried or installed overhead. Buried wire is the preferred method to counter enemy intrusion and electromagnetic pulse. However, wire should be overhead when crossing roads (except where culverts and bridges are available). Overhead wire should be a minimum of 18 feet or 5.5 meters above ground. Wire should be tagged according to a system in the SOP, with tags at the ends of each line. This facilitates reattaching wires when pulled out or cut. Overhead wire in the vicinity of helipads and airfields should be avoided. If used however, they must be clearly marked.

2-82. Commercial lines are used when approved by higher headquarters. To deny enemy collection efforts, secure devices should be used with commercial lines. If a unit is forced to withdraw, and with the approval of higher headquarters, existing wire lines (including commercial lines) are cut and sections removed to prevent enemy's use.

Telephones

2-83. The digital nonsecure voice telephone (DNVT) with digital data port is a four-wire telephone set which transmits and receives conditioned diphase modulated digital data, digitized voice, and digital loop signaling at 16 or 32 kilobits per second (kbps).

2-84. Loop signaling consists of sequences of cyclically permuted 8-bit control words, each word having minimal correlation with any other word. Loop signaling conforms to triservice tactical communication (TRI-TAC) standards. Once a call is established, the DNVT can alternate between voice and data modes. For voice communications, the DNVT uses continuously variable slope delta modulation encoding and decoding at 16 to 32 kbps. Extension network analog data interface is provided via the data port. For data communications the DNVT uses a data adaptor which interfaces directly with standard data terminal equipment such as the AN/UXC-7 tactical facsimile machine and the AN/UGC-144 communications terminal. Data calls may be placed manually via keypad or automatically via extension dialing through the data port.

2-85. The DNVT offers the following features:

- Digital telephone/data set for mobile subscriber equipment (MSE) and TRI-TAC systems.
- Full duplex voice or data communications.
- Push to talk for combat radio net interface.
- Standard four-wire loop interface.
- Mean time between failures: 150,000 hours.
- Automatic tracking of 16 or 32 kbps switch loop rate via autobaud feature.

2-86. The DNVT has the following specifications:

- Data rates of 16 or 32 kbps synchronous up to 2,400 bits per second asynchronous.
- Loop interface, four-wire line up to 4 km of WD-16 field wire.
- Line impedance 125 ohms+/-10 percent resistive.
- Operating voltage 24 to 56 volts direct current.
- Audio processing continuously variable slope delta modulation.
- Signal format: Conditioned diphase at 16 or 32 kbps.
- Codeword format: Cyclically permuted eight-bit words.

2-87. The digital secure voice terminal (DSVT) KY-68 is used for:

- Encrypting/decrypting voice traffic and providing secure digitized data traffic.
- Operating as a full- or half-duplex voice/data subscriber terminal at 16 to 32 kbps.

2-88. The KY-68 provides:

- Secure and nonsecure access to the switched networks.
- Secure access to non-switched networks.

2-89. Handset H-350/U is normally issued with the DSVT and includes a push-to-talk switch which is used when the DSVT is operating in the half-duplex mode to allow for voice transmission. The terminal consists of a five-position function switch, audio and ring volume controls, ring/busy, extension, and nonsecure warning indicators. The DSVT provides a digital communications interface with TRI-TAC and MSE circuit switches.

Radio

2-90. Operations often depend on radio as the primary means of communication. This is especially true during mobile combat operations. Radio communications should be kept to an absolute minimum until enemy contact is made.

2-91. Frequency modulated communications are the primary operations and intelligence (O&I) and administrative and logistics (A&L) nets and the means of communicating with ground forces. However, ATS has a broad range of other radios that facilitate joint, internal, long-range, and NOE communications. FM 3-04.111, appendix C, discusses the following systems:

- UHF for internal communications and communication with military aircraft.
- VHF for tactical communications and communications with civil and military aircraft.
- HF for long distance and NOE communications.
- SATCOM for over the horizon communications.

2-92. AICs, control towers and TACTs use HF and SATCOM capabilities to provide and receive—

- Airspace SA.
- Changes to airspace requirements.
- Orders from higher headquarters to support operations in near-real time.

2-93. AICs monitor preplanned SATCOM channels so equipped aircraft can communicate position and status reporting required for en route flight management purposes. Additionally, the AIC, control tower, and TACT may use SATCOM to provide preplanned airspace information services for special operations aircraft.

2-94. Each AIC operating at theater level uses SATCOM for inter-communications of commander's critical information requirements between ATS assets.

Visual and Audio

2-95. Visual and audio signals are in the signal operator instructions (SOIs) or SOP. The SOP may establish signals not included in the SOIs. Sound and visual signals include pyrotechnics, hand-and-arm, flag, metal-on-metal, rifle shot, whistles, horns, bells, and light guns. Visual cues are especially valuable in the FARP. Control tower teams and TACTs may use FAA light gun signals for ATC in the event of radio failures or when practicing radio silence.

THEATER AIRFIELD OPERATIONS GROUP ARCHITECTURE

2-96. Table 2-3 depicts TAOG communications architecture and the systems it utilizes.

Table 2-3. TAOG communication architecture systems

TAOG to:

ASCC
- Warfighter information network-tactical (WIN-T), wide area network (WAN), LOS, NLOS, LAN, communications/wire (COM/WIRE),

AOB
- WAN, LOS, NLOS, COM/WIRE,

ATS UNITS
- WIN-T, WAN, COM/WIRE, LOS, NLOS,

TAC
- WIN-T, WAN, LOS, NLOS, LAN, COM/WIRE

TSC
- WIN-T, WAN, LOS, LAN, COM/WIRE

ADJACENT UNITS
- WIN-T, LOS, NLOS, COM/WIRE

C3 AIR
- WIN-T, WAN, COM/WIRE,

DIV/CORPS/ARMY
- WIN-T, WAN, LOS, NLOS, LAN, COM/WIRE,

Radio Nets

2-97. The TAOG normally operates on its own and its higher headquarters command, O&I, and A&L nets. The TAOG must often monitor lower, adjacent, and supported unit radio nets. Critical higher headquarters radio nets must be monitored at all times to include:

- **Higher command net**. The TAC commander, all brigade CPs, and the S-3 enter and operate.
- **Higher O&I net**. The S-2 and all brigade CPs enter and operate.

2-98. Other staff sections and staff officers enter other higher nets as appropriate.

Command Net

2-99. A secure command net is controlled by the S-3 and used for C2. All subordinate maneuver support and sustainment units operate in this net. As a rule, only commanders, XOs, or S-3s communicate on this net.

Operations and Intelligence Net

2-100. The O&I net is controlled by the S-2. This net is used for details and discussion leading to analysis. When completed, it is relayed to the appropriate commander. The unit XO, operating in the tactical operations center (TOC), ensures the analysis is completed and relayed in a timely manner and by the appropriate means. If the rear CP is used, it also monitors O&I, allowing anticipation of critical support requirements and problems. Routine operations and intelligence reports are sent via the O&I net. It also functions as the surveillance net when required. The O&I net is normally not monitored by the TAOG or subordinate commanders.

Administrative and Logistics Net

2-101. The A&L net is controlled by the S-1 and S-4. This net is used for details and discussion leading to the resolution of administration and logistics matters. Critical information is relayed to the appropriate commander or discussed via the A&L net. The unit XO, operating in the TOC, ensures the analysis is completed and relayed in a timely manner and by the appropriate means. The A&L net, like the O&I net, is normally not monitored by the TAOG or subordinate commanders.

COMMUNICATIONS SECURITY EQUIPMENT

AN/CYZ-10

2-102. The AN/CYZ-10 data transfer device (DTD), also known as ANCD, is a portable, hand-held device capable of securely receiving, storing, and transferring data between compatible cryptographic and communications equipment. It is programmable and capable of storing 1,000 keys, maintaining an automatic internal audit trail of all security-relevant events that can be uploaded, and encrypting key for storage. The DTD is capable of keying multiple information security (INFOSEC) devices and is compatible with COMSEC equipment such as SINCGARS radios or KY-57 VINSON. The DTD is designed to be fully compatible with future INFOSEC equipment, meeting required signaling and benign fill standards. It will eventually replace the legacy family of common fill devices including the KYX-15 electronic storage devices, and KOI-18 paper tape reader. Only the DTD and KOI-18 support newer 128-bit keys. The DTD holds all keys needed for SINCGARS and SOI. Its internal clock uses a crystal oscillator making it inadequate; therefore it can not set the time in a frequency-hopping radio, such as SINCGARS or Have Quick. Crystal oscillators change frequency with aging, temperature, power supply voltage, and other factors. SINCGARS needs a number of different fills for frequency-hopping and transmission security. The A/N CYZ -10 is current scheduled to be replaced by the A/N PYQ -10(c).

KOI-18/TSEC

2-103. The KOI-18/TSEC, tape reader is used to load transmission encryption keys (TEKs) into the KY-57 and other equipment needing a key. It uses a photo optical reader that can read a paper tape that is pulled through the reader by hand. It is versatile and unforgiving, requiring accurate input on the tape. Other key loaders have electronic registers that can only hold keys in predetermined formats.

KYK-13/TSEC

2-104. The KYK-13/TSEC electronic transfer device is designed to hold TEKs. The KYK-13 holds up to six TEK variables.

ANDVT Minterm (KY-99)

2-105. The ANDVT MINTERM (KY-99) is a narrowband/wideband terminal that interoperates with VINSON (KY-57, KY-58) and SINCGARS. A self-contained terminal including COMSEC, KY-99 provides secure voice and data communications in tactical airborne/ground environments.

Chapter 3

Employment

The Army's primary task is to conduct prompt and sustained combat operations on land. Joint force commanders (JFCs) require immediate available land power to complement other service capabilities. The long-term presence of land power makes the otherwise temporary effects of air, sea, and space operations permanent. Land forces must be able to work with multinational forces, local populations, local governments, and other United States government agencies to develop conditions that successfully conclude campaigns.

SECTION I – AIR TRAFFIC SERVICES COMPANY

3-1. ATS assets promote safe, flexible, and efficient use of airspace that is shared with a multitude of weapon systems. ATS companies enable Army aviation to maximize technology by coordinating airspace and providing recovery capabilities. ATS units enhance air operations for ground force initiatives by providing airspace information, terminal, navigational, and forward-area support services. Interface occurs with theater, joint and combined, or host-nation ATS assets during all phases of operations. ATS organizations enable air operations by collecting, processing, displaying, and issuing airspace user information as well as implementing procedural and positive control measures and means for airspace deconfliction. Additionally, ATS companies support United States government agencies (interagency operations), as necessary, in the interest of national security during peacetime and contingency operations. The deployment of air traffic systems support three missions sets, airspace information services, terminal ATS, and forward area support services.

AIRSPACE INFORMATION SERVICES

3-2. AICs provide airspace information updates to friendly aircraft and are the primary coordination link between aircraft and the CAB/division. AICs operate as an execution arm of the associated A2C2 elements of the division by providing near real-time interface for airspace changes, while coordinating and deconflicting airspace requirements. The AIC ensures the flow of information required for air defense (AD) and air traffic management operations. AIC services and updates include:

Contents

- Critical in-flight advisories/updates of airspace deviations within the AO.
- Hostile aircraft intrusion warnings.
- Locations of rapid refueling points, FARPs, terminal facilities, and on call NAVAIDs.
- Terminal airfield status.
- Flight following and navigational assistance.
- Monitoring and assisting combat search and rescue operations.
- Planned airspace information, including C2 restricted operations zones (ROZs) or orbit areas for Army Airborne Command and Control System aircraft monitoring a close battle.
- Air mission planning data and airspace control information for terminal facilities.

- Current and forecasted weather information.
- Electronic data link to ABCS for terminal facilities.

TERMINAL SERVICES

3-3. Terminal services assist in the movement of aircraft, including takeoff, landing, separation, and sequencing. These services also include full-service radar, tower communications, NAVAIDs, precision and nonprecision instrumentation on illuminated airfields and airports, and traffic advisories. Terminal services can be temporary with minimal service support.

CONTROL TOWER TEAM

3-4. The terminal platoon tower team employs at tactical landing sites or main operating bases where high density air traffic exists. Tower teams are responsible for controlling transitioning, landing, and departing aircraft. As the primary ATS organization for regulating and integrating terminal services it establishes the nonprecision approach capability for the terminal AO. Aircraft movements in, out, and through the terminal area are closely coordinated with the tower, GCA, and AIC to ensure complete SA of the terminal AO for deconfliction of airspace and fratricide avoidance.

GROUND CONTROL APPROACH TEAM

3-5. The GCA team employs with the tower team, providing a near all weather, precision/nonprecision approach recovery capability and surveillance vectoring to arriving and departing aircraft operating in the terminal area.

FORWARD AREA SUPPORT SERVICES

3-6. TACTs coordinate aviation operations and are employed as initial entry forces at auxiliary areas and remote and austere locations. The mobility of the TACT allows the commander flexibility during all stages of force projection and provides aviation units with on-the-spot control and advisory capabilities in any environment. The TACT provides terminal and airspace information services where air assets require coordinated movement.

3-7. Operations such as AAs, LZ/PZ, and FARPs are best suited for the TACT. Within 1 hour of arrival, TACTs are capable of providing a nonprecision NAVAID, positive, and procedural ATS and secure UHF, VHF, FM, SATCOM and HF radio communications, and limited meteorological information. These teams employ manpack NDB (Pathfinder mode) and secure data/voice communications packages, providing low probability of interception.

3-8. The TACT is trained and equipped to provide initial rapid response ATS and C3 (in support of CAB and joint missions). It can operate for 72 hours without resupply or augmentation, and its small logistic footprint is conducive to rapid site establishment and retrogrades. The TACT provides certified ATC specialists uniquely trained in rapid tactical ATC operations.

EMPLOYMENT CONSIDERATIONS

OPPOSED ENTRY

3-9. Opposed entry operations require full coordination of joint capabilities to place large ground forces in the theater. Synchronized with other supporting fires, air assets engage the enemy well forward to delay, disrupt, and destroy enemy forces moving toward the battle area. Air assets also assist in countering the insertion of large enemy forces to the rear of friendly combat forces. ATS units provide—

- Terminal ATC services in the division AO.
- Airspace information services throughout the division AO, if required.

- TACT support throughout the battle area.
- Host nation airspace integration and airspace coordination within the AO.

UNOPPOSED ENTRY

3-10. The Army seeks a peaceful unopposed entry with host nation assistance. Units that deploy early may flow through airports or seaports into a theater staging base from which they will prepare to assist forward presence or host nation forces. At the staging base, they protect the force, reconfigure, build combat capability, train, and acclimate before conducting combat operations. Commanders sequence maneuver, combat support, and sustainment units into the contingency area to gain and sustain the initiative and protect the force. When part of initial entry forces, ATS companies establish terminal operations at landing areas as required. These landing areas can include existing host nation airfields or captured enemy airfields.

3-11. Unopposed entry operations allow the ATS company to deploy as a whole and begin establishment of services. By deploying as a company, time required to initiate such items as host nation/JIIM agreements, TERPs packages, and flight checks is reduced. Processing and publishing of airspace requirements, local flight rules, and airfield procedures can begin immediately, while other required airfield services are established with minimal delay.

OPERATIONAL CONSIDERATIONS

3-12. The type of operation determines equipment requirements, back-up capabilities, and the communications connectivity used. A CAB main operating base or division airfield is normally established by the terminal assets of the ATS company. Mission planning for ATS operations should incorporate close coordination and guidance from the CAB S-3. The following planning considerations should be utilized when preparing to conduct initial entry operations:

- **Type of mission**. The type of mission determines the section or sections of the company called upon to complete the mission.
- **Length of operations**. Promote input by platoon sergeants and facility chiefs. Factors such as food, water, fuel, medical support, and life support issues such as showers, laundry, and resupply of uniforms, boots, and other common table of allowances (CTA) 900–50 (TA 50) must be well planned. Fighter management issues such as sleep and feeding plans must be considered.
- **Type of services required**. This planning consideration involves instrument flight rule (IFR) recovery capability. A TERPs package must be developed and is forwarded to the United States Army Aeronautical Services Agency (USAASA) for approval and certification. Emergency IFR recovery procedures are interim procedures developed for emergency use. The approval authority for this procedure is the CAB commander.
- **Support requirements**. Support requirements are determined by the type of services and communications required at the airfield and the length of mission. Once established, these requirements must be met by the GSAB or CAB through division support and logistic channels. Some requirements may dictate the need for semi-permanent facilities as well as commercial power if hardened facilities are used.
- **Future mission of the base**. If the base is used as a theater airfield later in the operation, ATS companies plan for and execute—
  - Site surveys and TERPs packages as required.
  - Terminal airspace coordination.
  - Development and publication of local airfield procedures.
  - NAVAID frequencies requests with timelines for their use.
- **Current combat airspace/additional airspace requirements**. The current combat airspace is a critical planning measure. During the planning process a risk assessment is completed, and control measures are implemented. Current and future combat airspace is disseminated to all airspace users, controllers, and aircrews during the mission brief.

- **Environment**. The operating environment impacts the planning process. Terrain determines equipment placement and may impact equipment capabilities based on LOS radio and NAVAID performance. The terrain can also dictate site layout for LZ or FARP operations, and the type of formation flight used during the mission. SOPs should address factors considered in the mission, enemy, terrain and weather, troops and support available, time available, and civil considerations (METT-TC) mission planning risk assessment/management process.

AUSTERE AIRFIELDS/LANDING SITES

3-13. ATS company commanders consider specific capabilities when planning ATS operations. They must—

- Plan for continuous operations in all weather.
- Address aircraft survivability related to ATC procedures and ACMs.
- Ensure ATC aviation mission support without restricting operations.

3-14. Aviation mission support includes airspace and air traffic management, enabling maneuver commanders to orchestrate air and ground operations, lethal and nonlethal fires, and ADs in conducting decisive operations. ATS support is provided through automated airspace planning and en route, terminal, and precision recovery throughout the brigade combat team and division AOs.

3-15. ATS assets provide air traffic management and airspace information support using TAIS. A2C2 cells organic to the battle staff at brigade and above assist ATS elements in deconflicting, synchronizing, and integrating airspace requirements.

ASSEMBLY AREA OPERATIONS

3-16. An AA is a location in which the unit prepares for operations. The three types of AAs used by Army aviation units are forward assembly areas, heavy assembly areas (HAAs), and rear assembly areas (RAAs). Activities include planning; orders; maintenance; and class I, III, and V resupply. AAs are emplaced based on METT-TC and must be large enough for dispersion of the unit. AAs should not be located along an axis of advance. Other considerations involved in selecting appropriate AAs are—

- Security.
- Concealment.
- Accessibility to main supply routes.
- Air avenues of approach.
- Location of friendly units.
- Suitability of ingress and egress routes.

3-17. AA operations for ATS companies may be limited as required by the tactical situation; however ATS companies can operate at all three AAs simultaneously.

Forward Assembly Area

3-18. Units use forward assembly areas, also known as tactical assembly areas (TAAs), to reduce response time, conduct final planning and mission changes, and task organize as required by the situation. Normally, only operational helicopters and tactical CPs (brigade and battalion) are found in an forward assembly area, but occasionally a small FARP may collocate. Units use forward assembly areas for no more than 6 to 12 hours. The ATS team used forward assembly areas is the TACT.

3-19. The following ATS are available at TAAs:

- Weather information.
- Visual surveillance of landing area.
- Procedural control as required.
- Situational updates about friendly and enemy situation.

- On-call nonprecision approach NAVAIDs for station location.
- Emergency marking and lighting (inverted Y).

Heavy Assembly Area

3-20. HAAs are locations where aviation units conduct routine maintenance, resupply, planning, and other preparations for combat operations. These areas contain life support requirements for combat crews and maintain crew endurance activities. The CAB main CP always locates in the HAA. Elements in the HAA can relocate while unit aircraft fight forward. HAAs displace according to METT-TC. These locations are areas of increased air activity and are normally serviced by the TACT. ATC services in the HAA are more established and can include—

- Limited meteorological information and A2C2 situational update information.
- Separation and sequencing of aircraft.
- Development and processing of airspace requirements.
- Emergency nonprecision IMC recovery operations.
- Emergency marking and lighting (inverted Y).

Rear Assembly Area

3-21. Units establish RAAs for sustainment operations that are not feasible in the HAA. When enemy air threat is low, the RAA collocates with the HAA to better facilitate aviation maintenance. The RAA relocates according to METT-TC. During deployments, the RAA may remain at the intermediate staging base (ISB) while the brigade CP establishes operations at the host nation HAA. The aviation support battalion should be positioned so that it moves as little as possible to allow maximum time to conduct sustainment operations.

3-22. Terminal operations in the RAA are provided by the control tower and GCA teams of the terminal platoon; however TACTs may be more advantageous to terminal control for shorter duration operations. ATC services are more extensive than in the forward or heavy assembly areas. These services include—

- Providing emergency precision and nonprecision approach NAVAIDs.
- Providing aircraft separation and sequencing.
- Developing and coordinating required airspace, ROZs, ingress and egress routes, and entry and exit points. Ingress and egress routes should be built, when possible, with 30 degrees or more of separation to facilitate the safe, orderly, and expeditious movement of air traffic.
- Providing emergency marking or lighting for the LZ.

3-23. Figure 3-1 and figure 3-2, page 3-6, depict an AA in which two LZs are established to accommodate landing and parking. Naming conventions of the LZs are orientation: driven east/west (Echo/Whiskey) or north/south (November/Sierra). LZ names become part of the aircraft's initial inbound report.

3-24. AIC in RAA operations provide—

- Dissemination of weather and critical flight information.
- Interface with air defense and airspace management (ADAM)/Brigade Aviation Element cell and terminal facilities to coordinate airspace information.
- Establish comprehensive flight following structure supporting air traffic to and from rear area.

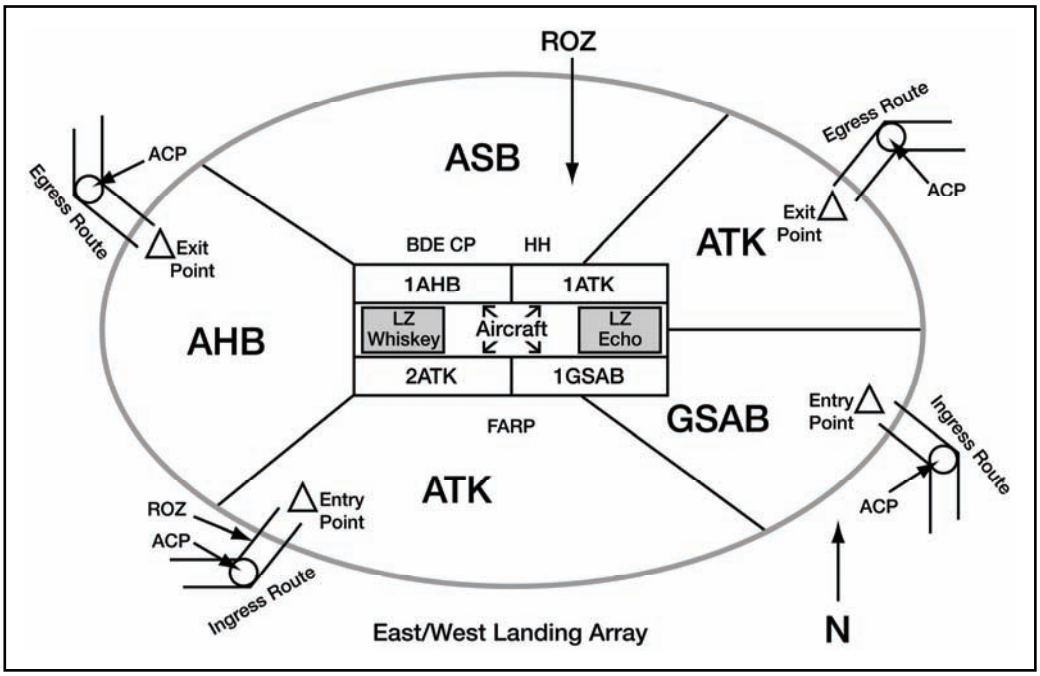


Figure 3-1. Depiction of assembly area ground graphics and airspace

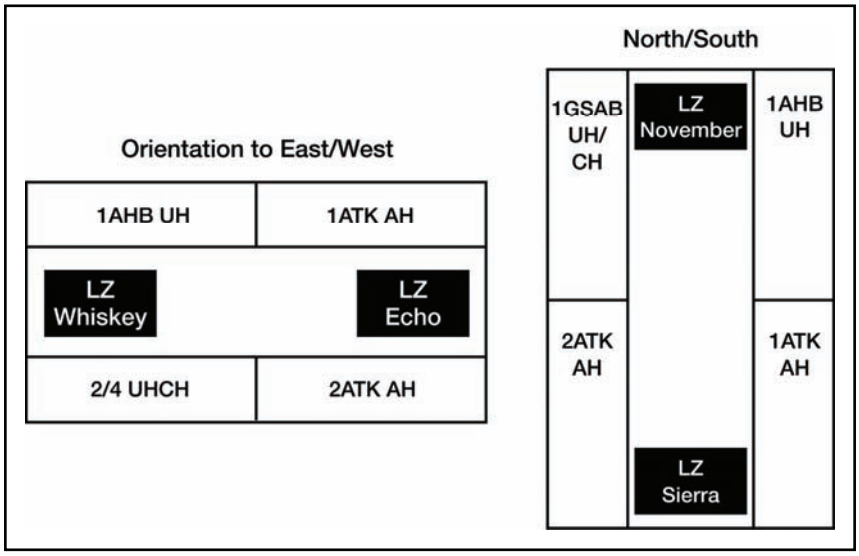


Figure 3-2. Landing zone orientation

FORWARD ARMING AND REFUELING POINT OPERATIONS

3-25. ATS supports FARP operations based on METT-TC. Under some circumstances, ATS units can provide aviation commanders with an extra measure of safety and synchronization to facilitate efficiency. TACT can manage aircraft flow for faster, safer, and more efficient operations. A team has four Soldiers equipped with an HMMWV-mounted tactical terminal control system (TTCS) and an AN/TRN-30(V) 1 low-power NDB that can be set up within 30 minutes. The TACT provides a short-to-medium range NDB; secure VHF, UHF, FM, HF, and SATCOM radios, and limited weather observing capability.

3-26. FARP survivability requires frequent displacement. Few locations permit arming and refueling more than three times. A good planning figure for FARP duration is 3 to 6 hours. Careful site selection, effective camouflage, and minimum personnel and equipment lead to survivable, mission-capable FARPs. ATS units supporting FARP operations must consider and be involved in the planning process of ACMs/FSCMs such as ROZs, no-fire area, restricted fire area, entry and exit points, and ground holding areas (figure 3-3). ATS services at FARP locations provide—

- Limited meteorological information.
- Visual surveillance of landing area.
- Procedural and positive control as required.
- On-call NDB for aircraft to locate FARP.
- Emergency marking and lighting.
- Airspace coordination with AIC and control tower teams.

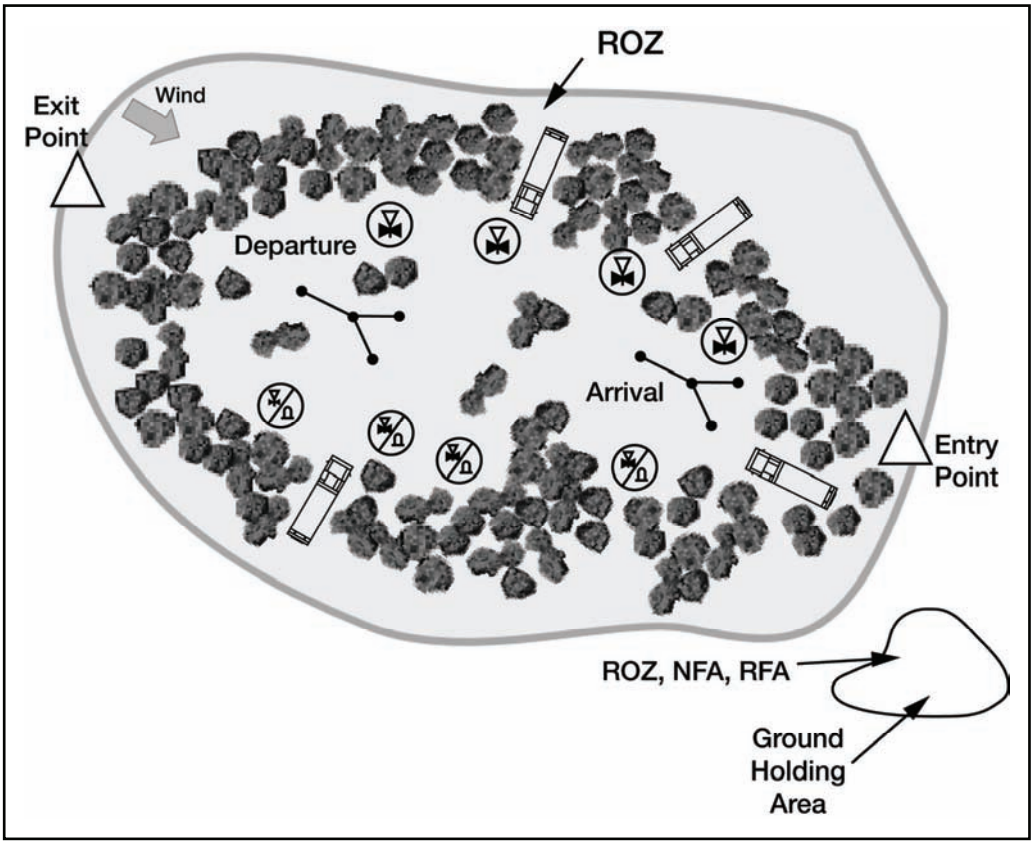


Figure 3-3. FARP with associated airspace and FSCMs

LANDING ZONE/PICKUP ZONE OPERATIONS

3-27. LZ/PZ operations are ideal for the TACT. Team members are F7/Pathfinder qualified and skilled in austere operations. During planning, the TACT chief works with aviation units to select landing sites. When selecting LZs from maps, aerial or ground photographs, or aerial reconnaissance, consider the following:

- **Number of helicopters**. If a large number of helicopters are to be used, multiple sites or successive lifts may be required.
- **Type of formation**. Landing formation is determined by the area available for use.
- **Surface conditions**. Consider the firmness of the ground to avoid bogging down or creating excessive dust from loose dirt, sand, or snow (creates visibility problems especially at night).

- **Ground slope**. Landing areas should be as flat as possible. To ensure safe operations, the ground slope should be no more than seven degrees.
- **Prevailing winds**. Landing and takeoff are aligned with these winds if possible.
- **Landing point distances (table 3-1)**. Helicopter landing areas measure 25 to 100 meters in diameter depending on helicopter type.
- **Landing site markings**. Use the inverted Y as shown in figure 3-4.

Note: Landing distances depicted in table 3-1 are minimum required distances. Unit SOPs should dictate standards for their unit.

Table 3-1. Landing distance sizes

Landing Point Size	*Distance (meters)*
1	**25**
2	**35**
3	**50**
4	**80**
5	**100**

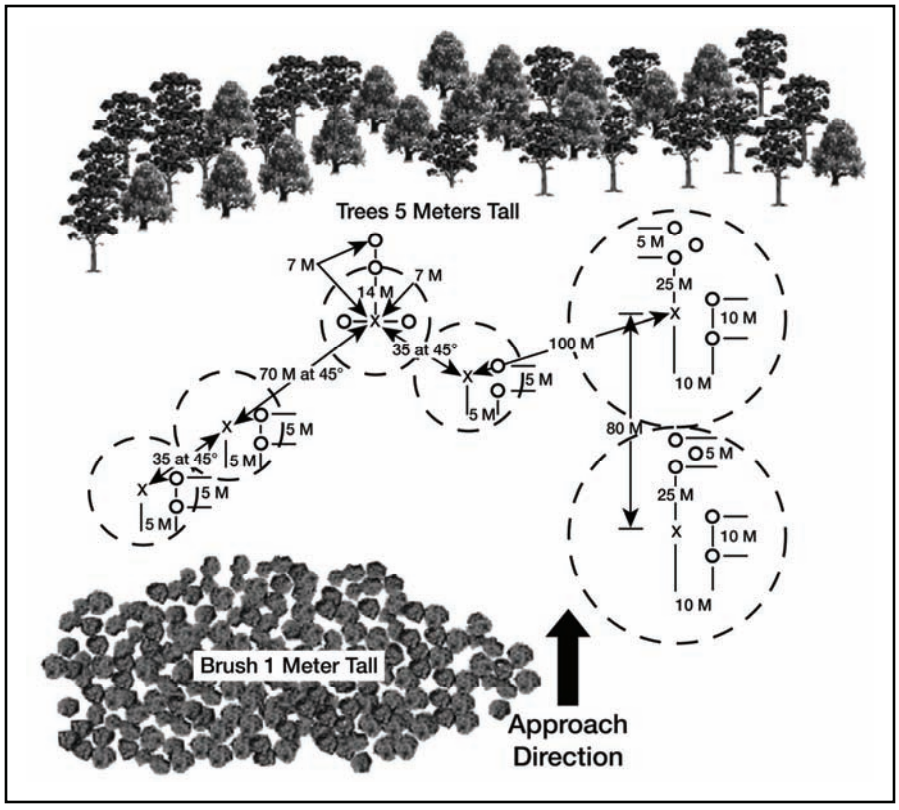


Figure 3-4. Depiction of inverted Y and additional landing sites

3-28. ATS duties include—

- On-call NDB used for identification and location of LZ or ACP.
- Visual surveillance of landing area and visual sequencing and separation of aircraft.
- Development and coordination of required airspace for the operation. Figure 3-5, page 3-9, depicts LZ airspace requirements.

- Situational updates on weather, enemy, and A2C2 information.
- Lighting and marking of LZ/PZ.

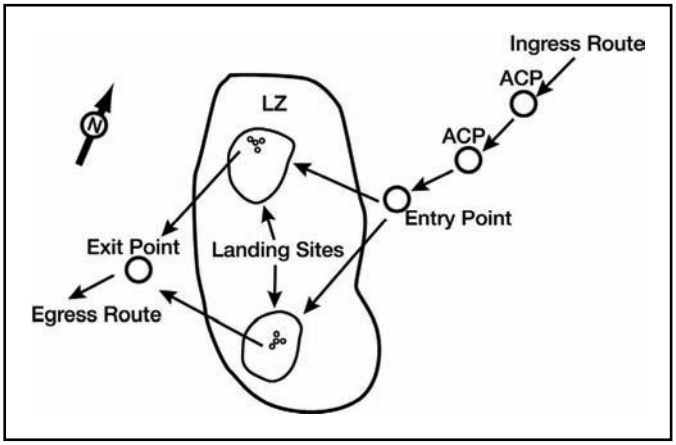


Figure 3-5. LZ airspace requirements

FORWARD OPERATING BASE/BASE CAMP OPERATIONS

3-29. Army deployment objectives require strategic responsiveness wherever needed. This operational concept depends on flexible combinations of Army and joint capabilities across full spectrum operations. The Army establishes airfields and forward operating bases (FOBs) to increase responsiveness and reduce battlefield distances. The following factors are considered when planning airfields and FOBs:

- Occupy host nation airfields if available and tactically acceptable.
- Using abandoned or captured airfields to reduce construction and support requirements.
- Use roads, highways, or parking lots if airfields are not available in sufficient quantity or unsuitably located.
- Construct an airfield or FOB.

3-30. These planning factors broadly establish the environment for which aviation operations are expected to operate. Campaign planning at joint level establishes airfield requirements early on with consideration of service-specific objectives. Army, Air Force, Navy, and Marine engineers all have the capability to design, plan, construct, upgrade, and maintain airfields and heliports. Airfields and heliports are classified by their degree of permanence and the type of aircraft they are designed to support. Army airfields and heliports are divided into six classes (table 3-2).

Table 3-2. Army airfield and heliport classes

Class	*Definition (controlling aircraft weights reflect operational weight)*
I	Heliports/pads with aircraft 25,000 lb (11,340 kg) or less. Controlling aircraft (UH-60)-16,300 lb (7,395 kg).
II	Heliports/pads with aircraft over 25,000 lb (11,340 kg). Controlling aircraft (CH-47)-50,000 lb (22,680 kg).
III	Airfield with class A runways. Controlling aircraft (combination of C-23 aircraft-24,600 lb (11,200 kg) & a CH-47 aircraft at a 50,000 lb (22,680 kg). Class A runways are primarily used for small aircraft (C-12 and C-23).
IV	Airfields w/class B runways. The controlling aircraft is a C-130 aircraft at a 155,000 lb (70,310 kg) operational weight or a C-17 aircraft at a 580,000 lb (263,100 kg) operational weight. Class B runways are primarily used for high performance and large heavy aircraft (C-130, C-17, and C-141).
V	Heliports/pads supporting Army assault training missions. Controlling aircraft (CH-47)-50,000 lb (22,680 kg).

Table 3-2. Army airfield and heliport classes

VI	Assault LZs for operations supporting Army training missions that have semi-prepared or paved landing surfaces. Controlling aircraft (C-130-155,000 lb [70,310 kg] or C-17-580,000 lb [263,100 kg]).

3-31. An airfield is also described on the basis of its location within the AO. Close battle area airfields are intended to provide focused logistics support or to support combat missions of short-range aircraft such as attack helicopters and UASs. These airfields are designed for initial or temporary operational standards, depending on mission requirements, and may be paved or semi-prepared. Support area airfields provide general logistics support and support of combat missions of longer-range aircraft. These airfields are designed to temporary or semi-permanent standards, depending on mission and operational requirements. Normally these airfields are paved and provide a link between close battle areas and sustainment area airfields. Sustainment airfields provide logistics support forward from fixed, secure bases, and support combat operations of long-range aircraft and are designed to be semi-permanent or permanent facilities.

3-32. After seizing an FOB or available airfield from which sustained main base or base camp operations can be conducted, the CAB may be able to request joint fixed-wing (FW) refuel/resupply support.

3-33. Army H-60 and CH-47 aircraft can establish refuel points from the aircraft (Fat Hawk operations for H-60s and Fat Cow for CH-47s), while the Marine Corps CH-53s have a unique refueling capability that can support supply points, operations in deep areas, and other specialized mission applications.

3-34. The KC-130 or C-17 can operate from small airfields with limited supporting infrastructure. The airfield runway must be 3,000 to 5,000 feet (914- 1524 meters) long and 90 feet (27.4 meters) wide with graded and compacted gravel or clay. If KC-130 or C-17 is used as a primary means of resupply, runway repair requirements will increase dictating engineer augmentation. CH-53 tactical bladder fuel distribution system and CH-47 Fat Cow refueling does not require a runway, but does require a large relatively flat area similar in size.

AIR TRAFFIC SERVICE SUPPORT

3-35. The ATS company can be task organized to meet any various combat operations. ATC services required at an FOB dictate the number of personnel and type of equipment necessary to support the mission. Each ATS company is capable of providing the following services:

- Control tower.
- Nonprecision NAVAID AN/TRN–30 (V) 1 and (V) 2 NDBs.
- GCA radar.
- Survey and creation of TERPs packages.
- Support for continuous all-weather operations.
- Interface with A2C2 cells throughout the division AO.
- Execution of flight following operations as required.

3-36. In addition to the physical geography of the site, planners consider the related activities in or around the main operating base and landing areas. These functional site considerations address locations of—

- Fuel points and fuel storage areas.
- Ordnance storage areas.
- Arming/dearming areas.
- Medical evacuation areas.
- Weather support services.
- Field of view.
- Obstructions.

3-37. Additional planning considerations for ATS operations include—

- Establishing a phased plan of equipment arrival to facilitate operational capabilities and communications.
- Selecting an advanced party to conduct physical reconnaissance, locate positions for equipment, and plan equipment sites.
- Preparing diagrams that depict equipment locations and are the basis for set-up crew briefings.
- Ensuring site plans consider maximum dispersal and remoting of equipment to reduce electromagnetic and infrared signatures.
- Designating alternate site locations or satellite assembly areas.

SECTION II – THEATER AIRFIELD OPERATIONS

3-38. The TAOG and its subordinate elements are optimized for theater aviation support. The TAOG and AOBs are organized and equipped to facilitate early deployment by establishing expeditionary airfields in support of Army operations. These organizations provide Army airfield management and C2 at theater-level airfields, FOBs, and other areas designated by the TAC.

3-39. The AOB organization and its related ATC assets are deployed at locations requiring the operational management of airfield activities or at locations without an organic ATS element. This organization often conducts transition operations from the ATS company of the GSAB during an advancing movement or stability operations. For planning purposes, transitional ATC operations could occur for an extended period based on the intended timeframe of the operation. The synchronization of AOB resources to produce maximum operational effectiveness requires special attention to differences in the capabilities of the ATS companies and the AOB ensuring a smooth transition.

INTERMEDIATE STAGING BASE

3-40. The ISB is a temporary location used to stage forces before insertion into the combat zone. The first deployment of a TAOG or AOB can take place here. In an ideal situation, secure bases are available in the AO for RSOI and continued support of the deploying force. The ISB is normally located within the theater of operations and outside the combat zone and AO. In cases where the joint force must secure a lodgment to project the force, an ISB may be critical to success.

3-41. If established, the TAOG along with one or more AOBs may be required to establish an airfield for staging forces. The ISB airfield may be the initial theater reception and staging facility making it the hub of Army aviation movement into the theater. Deploying forces debark from strategic lift, reassemble, and prepare for missions in the AO. Onward movement from the ISB to the combat zone may be multimodal and requires some level of reassembly in the AO. Transportation assets employed in onward movement include strategic and theater assets such as truck, rail, sea, and airlift. These movements are considered components of the deployment and are included in the time-phased force deployment document.

3-42. If tasked to operate the ISB, the Army should have a primary role in the selection process. This process involves TAOG assessment and recommendation. The ISB airfield should include sufficient Army C2, maneuver, sustainment, and joint support to enable force projection into the combat zone. The ISB airfield should be shielded from long-range engagement systems, such as missiles, along with enemy special operations force (SOF) and civil threats.

3-43. The longevity of the ISB airfield varies according to circumstances. The airfield may function as a secure facility for split-based operations during the operation or in the following capacities:

- Logistic management for rear area functions supporting the forward deployed force.
- Restricted forward deployment to only those forces necessary to execute the mission (reduces logistical footprint).
- May serve as a rest and relaxation site (in an austere unstable area).

3-44. As the lodgment expands and tactical situation permits, the JFC can establish a theater staging base within the AO, which may require the deployment of additional AOBs or redeployment of the TAOG as part of the RSOI process. Figure 3-7 depicts an ISB.

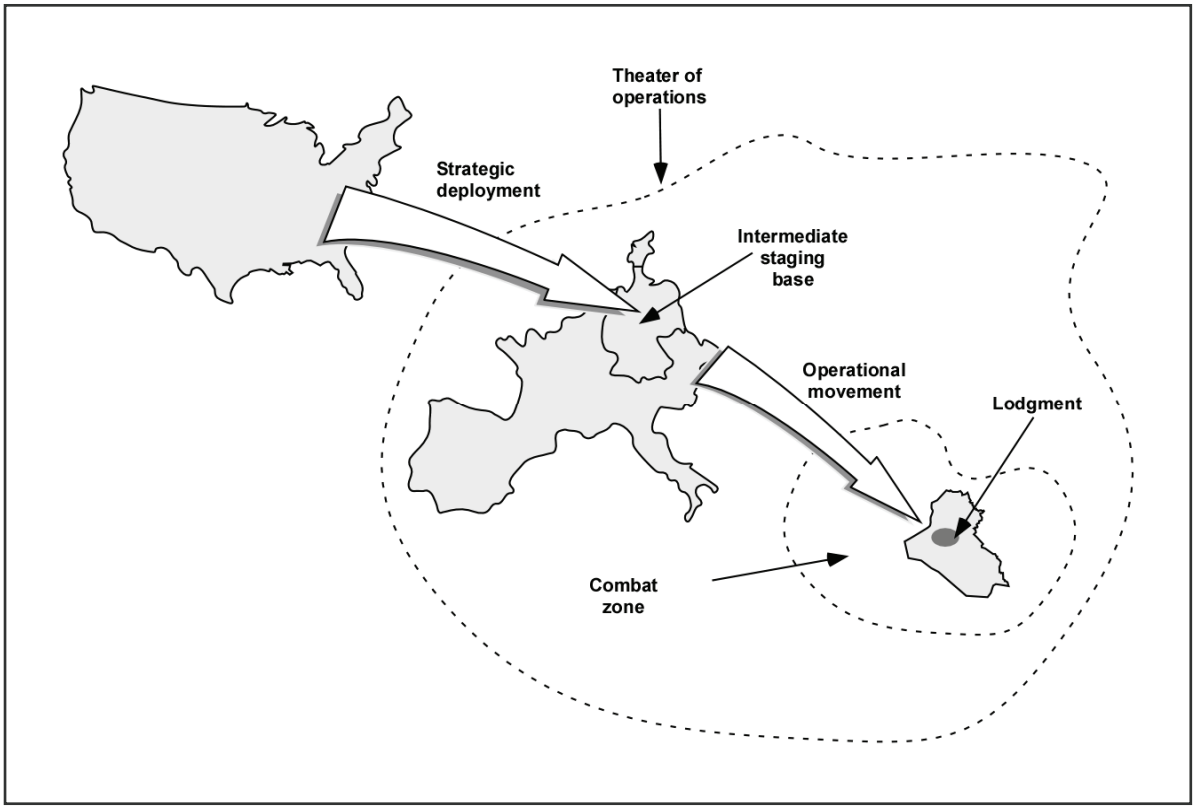


Figure 3-6. Intermediate staging base

PRE-DEPLOYMENT PLANNING CONSIDERATIONS

3-45. Predeployment planning considerations must be closely coordinated to ensure required assets, support elements, and resources have been coordinated and are available at the desired airfield location.

3-46. Predeployment planning considerations include—

- Host nation, JIIM airspace, and ATC agreements and directives determining regulatory guidance used by ATC with adjoining nations/ICAO. These agreements should encompass all airfields and areas approved for or restricted from use.
- Frequency requirements for radio, radar, NAVAIDs, and nets.
- Airfield lighting must be planned if night or IFR operations will be conducted. The Army currently has a limited airfield lighting capability and requires TAOG or higher headquarters coordination.
- National Imagery and Mapping Agency may provide geodetic control for the airfield, proving valuable for GPS precision approaches or emergency inadvertent instrument meteorological condition (IIMC) procedures in the future. Also refer to services/coalition/Air Force commands or air staff databases for existing site surveys.
- Base operations support planning should occur before deployment. The supplier and contact lists for support items are formulated early in the planning process. These lists include areas such as equipment support, power, base defense considerations, supply, maintenance personnel

support, billeting, security, medical, and food and water, engineer support, communication needs, and signal support requirements and availability.

- Airfield services required*:
  - VFR/IFR radar, terminal.
  - Precision/nonprecision approaches.
  - Manned and unmanned systems and over flight traffic.
  - Refuel aircraft maintenance.
  - Crash rescue.
  - Air Force weather support.

Note: *These requirements affect the planning process and augmentation requirements.

- Airspace requirements may impact host nation and JIIM agreements. Determine airspace requirements early and coordinate through the appropriate headquarters combat airspace managers. This ensures inclusion in AOC publications. Terminal airspace and airfield procedures are examples of airfield requirements.
- Interface between terminal and en route systems.
- Valid planning questions for terminal and en route coordination include:
  - Who can provide en route support?
  - What are the procedures (IIMC, filing IFR)?
  - Where are IFR procedures published?

EMPLOYMENT CONSIDERATIONS

TYPE OF OPERATION

3-47. The type of operation has direct bearing on its planning factors: Is it going to be used as a main operating base or a FOB; are joint, interagency, and multinational forces going to use it; and is a FARP required? It also has direct bearing on equipment: Are NAVAIDs required; will a back up capability be needed; what is the duration of the mission; and what communications and automation connectivity are required?

HOST NATION/ADJACENT NATION AIR TRAFFIC CONTROL CAPABILITIES

3-48. When planning deployment of a TAOG, it is crucial to know the condition and capabilities of airfields, NAVAIDs, airspace considerations, and other ATC resources in the AO. This information enables the planner to determine the types and mix of assets required to support initial operations until a full airfield operations sustainment package is deployed. The condition of host nation facilities may greatly simplify any agreements needed.

ENGINEER SUPPORT

3-49. The AOB may require engineer support for a specified mission or time period to—

- Improve terrain and structures at unit locations.
- Conduct required airfield surveys. Results can be used for TERPs data collection.
- Build, improve, or repair runways or landing pads and protect them from erosion by emplacing culverts and sandbags for drainage. Engineers can build runways to support C-130 and C-17 air traffic.

- Protect semi-fixed positions from enemy observation and fires. Because airfields are usually located in large open areas to accommodate aircraft, there is a large demand for survivability support. Berms for CP protection, digging in FARP locations to protect vital class III/V assets, defensive fighting and survival positions, and defensive perimeter obstacles are all priorities.
- Build or improve aircraft revetments.

TERMINAL INSTRUMENT PROCEDURES

3-50. Survey-qualified TERP specialists conduct and participate in initial site surveys. If engineer support for site surveys is needed, coordination for these services is done early in the planning process. TERPs specialists use site survey information to develop approach procedure packages. These packages are forwarded to the appropriate higher headquarters TERPs office responsible for the designated AOR. Authorization to use the procedures ultimately remains with the appropriate flying operations authority and/or the commander exercising operational control of the aircraft. During contingency operations, an in-theater TERPs liaison may be established to develop and approve instrument procedures.

3-51. As per AR 95-1, emergency recovery procedures will be developed as a contingency plan for IIMCs. Recovery procedures will be developed using approved DOD/FAA instrument approaches in the AO and should be a joint effort between ATC and the supported aviation unit. In locations without an approved DOD/FAA approach or commercially developed approach, an emergency GPS recovery procedure will be developed per the aircrew training manual. If used as part of an emergency recovery procedure, non-DOD/FAA approaches will be submitted for TERPs review and approval through Headquarters, USAASA or United States Army Aeronautical Services Detachment-Europe. Pending approval, these approaches will only be used in visual meteorological conditions (VMCs) or during an actual emergency. The first colonel/0-6 in the chain of command with mission risk approval authority must approve the emergency procedure containing an unapproved instrument approach. **This authority will not be further delegated.** The risk associated with the recovery procedure will be mitigated through the mission approval process and further defined in unit SOPs. Planned use of non-DOD/FAA instrument procedures for flight in IMC requires approval as per paragraph 5-5 of AR 95-1. Manual entry of waypoints is permissible when using emergency GPS procedures. **Flight in IIMC that violates FAA, host nation, or ICAO regulations will be considered deviations as per paragraph 1-6 and will be processed as per paragraph 2-13 of AR 95-1.**

FLIGHT INSPECTION

3-52. Flight inspection aircraft certify instrument procedures and their associated NAVAIDs. Flight inspections ensure the safety of NAVAID signals and published instrument procedures for IFR use. These inspections verify the performance of air navigation services and their associated instrument flight procedures conform to prescribed standards documented in FAA and DOD directives, and in Annex 10 to the convention on ICAO. Flight inspection has both operational and legal ramifications. Flight inspection of instrument procedures is required in accordance with FAAO 8200.1, TM 95-225, TM 95-226, FAA (FAAH) 8260.3.

Degrees

3-53. The following four options reflect the different degrees of flight inspection available to the JFACC (listed from higher to lower risk).

Note: Options 1 and 2 are available when a flight inspection is impossible/limited and military operations must be conducted. However, they do not eliminate the requirement to conduct a flight inspection. The flight inspection requirement is postponed until the situation permits inspection in accordance with options 3 or 4.

Option 1. Approval without Flight Inspection

3-54. If the situation dictates, the JFC may approve the use of NAVAIDs/approach without a flight inspection. This approval is only for military aircraft under JFC OPCON. Aircrews flying the procedures should be advised that flight inspection certification has not been accomplished, and instrument procedures should be labeled and limited to those aircrews specifically authorized. Other aircraft (FAA, Civil Reserve Air Fleet (CRAF), and/or ICAO) are not authorized to use the procedure.

Option 2. Military Emergency Flight Inspection Procedures

3-55. In accordance with TM 95-225, when it is deemed necessary by military authorities, the abbreviated flight inspection procedures of chapter 24 may be used. However, as soon as conditions allow, the NAVAIDs and instrument procedures must be reinspected using normal procedures and tolerances. The JFC may approve the use of these abbreviated flight inspection procedures. For additional flexibility, radar approaches and certain new instrument procedures may be certified using a local military aircraft with a flight inspector riding on the flight deck. This option is intended to permit a commander to continue flight operations while waiting for a restricted or normal commissioning inspection. This inspection will allow a theater commander to have temporary IFR capability for aircraft OPCON to the JFC/JFACC. Other aircraft (FAA/CRAF/ICAO) may be authorized to use the facility at the discretion of the JFC.

Note: Nearly all flight inspections must be performed during daylight hours and require VMC weather. An inspection of a single NAVAID normally takes half a day and one sortie to complete.

Option 3. Restricted Facility Commissioning

3-56. This inspection certifies the facility using normal procedures but 1 day and two sorties (in VMC weather) to complete. The restricted facility commissioning inspection permits use by any aircraft. Areas evaluated to be acceptable are certified for use, and the remaining areas/procedures not evaluated are restricted. The local (deployed) airfield operations/ATC manager will publish the restrictions in appropriate NOTAMs.

Option 4. Normal Commissioning

3-57. This is the certification of all procedures (arrival/approach/departure) and areas of NAVAID coverage. Optimally, this inspection takes 2 to 3 days, and four to five sorties (VMC weather) to complete. It is required for full use by DOD, CRAF, FAA, and ICAO aircraft.

AIRSPACE AND AIR DEFENSE PROCEDURES

3-58. Planners prioritize, integrate, and closely coordinate airspace control and AD requirements. The AIC and tower facility chief coordinates with the ADAM element of the supported aviation or AD unit assigned to defend the airfield. They work to establish and publish a BDZ and airspace C2 procedures that include—

- Ascertaining the size and shape of the BDZ. BDZ dimensions are normally determined by the effective engagement envelope of the supporting air defense systems (for example, Avenger, C-RAM, and Patriot) and anticipated air traffic patterns. Establishing entry and exit procedures, including safe lanes and identification friend or foe (IFF) mode and code requirements, during BDZ construction.
- Identification of aircraft friend or foe. These procedures should not delay offensive operations and be simple enough for aircrews and ground operations personnel to execute. They include visual, electronic, geographic, and maneuver procedures for differentiating friendly or hostile aircraft.
- Coordinating with local ground-based air defense unit(s) for BDZ early warning cueing, facilitating engagement of enemy aircraft.

3-59. AD units must be free to engage hostile targets, aircraft, and missiles within prescribed rules of engagement (ROE). The AIC and control tower share the responsibility of ensuring procedures are disseminated to friendly aircraft.

AIRSPACE MANAGEMENT PLANNING

3-60. Airspace management planning involves segmenting assigned airspace by volume and time for the safe and expeditious flow of air traffic. Airspace management also involves establishing various air defense control measures, which are designed to protect friendly installations from enemy air attack. Planning considerations include—

- Analyzing suitable airfields to determine dimensions, and possible conflicts with civil aviation, UAS, and other users of this airspace.
- Preferred routings for friendly aircraft.
- Determining the size and shape of terminal control airspace (Class D airspace).
- Preparing TERPs for designated airfields and submitting packages for approval, flight check, and publication.
- Coordinating with the higher headquarters A2C2 element to publish ATC terminal procedures in the ACO/ACP and APG.

3-61. Normal ATC procedures, such as traffic patterns and VFR inbound and outbound routes, are developed by the tower chief in conjunction with the ATASM technician and used by supported aviation units when appropriate (threat based). Tactical Army aviation flight into and out of LZs/PZs is typically oval or race track. ATC procedures must incorporate tactical entry and exit patterns into the airfield procedures.

3-62. Terminal rotary-wing procedures in a high threat situation can enhance rotary-wing survivability. Traffic density and type are also a factor in the use of any specialized rotary-wing procedures. Numerous landing pads should be constructed on the airfield by engineers. The number is dependent on the area available for use and the proper separation between pads and runways. Special rotary-wing procedures can be established by the use of a wagon wheel overlay (figure 3-8, page 3-17) dividing the airspace into eight 45-degree sectors starting at 5 nautical miles and continuing each 5 nautical miles out to 15 nautical miles or whatever mileage is deemed appropriate. These sectors can be designated by an alpha numeric system and should be changed regularly and published within the SPINS of the current ATO/ACO cycle. The frequency of changes is based upon the threat activity level. The sectors are aligned with existing runways or helipads on the airfield and allow rotary wing aircraft freedom of maneuver below the established coordinating altitude. The closer aircraft are to the airfield, the more restrictive the sectors and control becomes. The use of sectors and landing pads eliminates the need for traffic or holding patterns. Aircraft report crossing each phase line or 5-mile increment of the sector, allowing traffic calls and procedural separation by controllers, until aircraft are cleared to land direct to the helipads, which eliminates the need for runway use by rotary-wing traffic in situations where a large volume of FW traffic exists.

3-63. Terminal flight following by sector as opposed to block time flight following allows the controller the ability to make traffic calls and provide procedural separation of aircraft within the sector. One possible sector solution would be to use of the wagon wheel overlay mentioned above. The use of this system and how restrictive the system should be is based on traffic density and operations in or near the terminal area. Sector flight following and SA are critical elements of airspace management during urban operations. Sector flight following would allow terminal controllers to pinpoint aircraft locations facilitating necessary traffic advisories and procedural separation of aircraft.

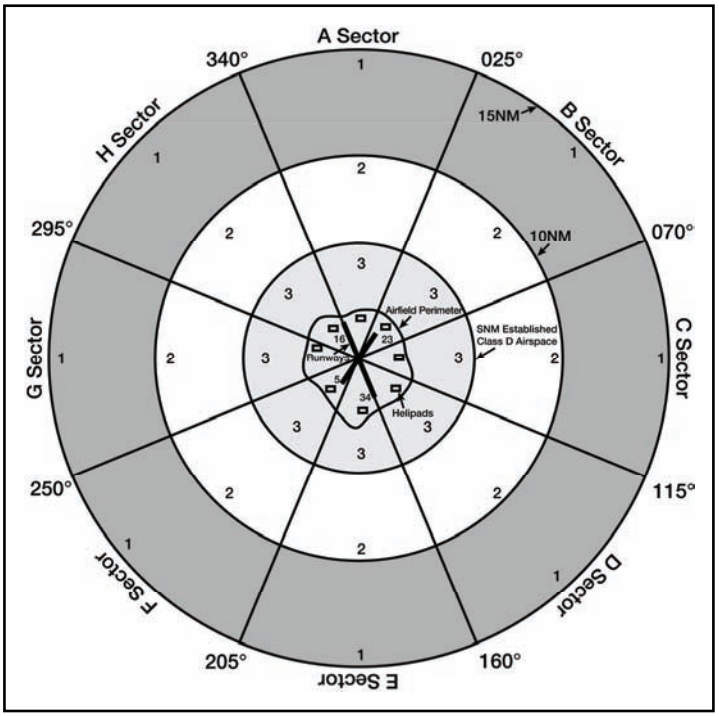


Figure 3-7. Example of wagon wheel overlay

AUSTERE TO ENDURING AIRFIELD

3-64. Enduring airfield operations can be defined as when all AOB capabilities have been established and are fully sustainable. These operations require a transition period; however major factors make it difficult to establish a hard time line. Factors such as host nation and JIIM agreements, flight checks, or certified TERPs packages may take longer to complete then first anticipated. Every effort should be made to complete all necessary service requirements for the airfield within 45 to 120 days from establishment. The type of entry operation could delay or enhance this transition period depending on whether the entry operation was opposed or unopposed.

AIRFIELD MANAGEMENT

3-65. The management of the airfield must be established as soon as possible; it is the driving force behind the smooth transition to an enduring airfield. The airfield commander is responsible for the safe operation and accommodation of aircraft by constructing and maintaining facilities and procedures and controls. Responsibility for daily operations is delegated to the operations officer of the AOB.

BASE DEFENSE OPERATIONS CENTER

3-66. A successful force protection plan keys on safeguarding critical assets found at airfields and FOBs. One fundamental consideration of airfield security is the resolution of command authority. A conflict often arises when command relations and responsibilities of units occupying airfields are not clear. All tenant units are responsible to the commander for base and airfield security and should have representatives on the planning board. The ATC operations officer should fill this duty requirement for the AOB. The base commander must have tactical control over these units for conducting force protection operations. The BDOC functions as a tactical command post and is responsible for the synchronization of force protection measures. This center must be integrated through communication links with the airfield management element, QRF, and ATC facilities to effectively counter threats with airborne and counterfire assets. BDOCs establish threat conditions based on the likelihood of attack. Security planning for airfields and FOBs starts at the JFC level. The JFC assigns responsibilities for joint security to component commanders.

3-67. BDOC responsibilities include, but are not limited to the following:

- Planning, coordinating, and controlling security forces.
- Planning and coordinating ground fire and close air support within the AOR.
- Integrating ground base AD assets.
- Coordinating and assigning security responsibilities with tenant units.
- Coordinating and supervising activities in support of the base defense plan.
- Coordinating security measures with higher agencies.
- Monitoring unit movement and facility positions within the AOR.
- Establishing and maintaining communications with security forces and other airfield, AD, and counterfire platoons.

Reaction Forces

3-68. Reaction forces and attachments must be fully integrated into the overall plan. Each individual must have a clear and current SU of friendly and enemy forces in the AO. For example, a BDOC reaction force should know if military police are conducting mounted patrols near the BDOC. The overall reaction force plan must integrate those military police units or establish boundaries between the reaction force and the military police unit.

3-69. A clear chain of command and training supported by battle drills are essential for reaction force preparedness. They must assemble and be ready to fight in 10 minutes or less. Proper preparation includes the following:

- Alarms should be a part of the airfield and BDOC SOPs.
- Reaction plans are rehearsed and executed on a routine basis. The reaction to a night attack must be second nature if the enemy force is to be repelled.

3-70. Each reaction force assembles based on an alarm or orders. Personnel move to a predetermined rally point, establish communications, and conduct operations as required to counter the threat.

Preparation for Security and Defense

3-71. Physical preparation for security and defense of the base camp and airfield includes—

- Ensuring each Soldier is briefed, and has a copy and understands the ROE (for complicated ROE, it is often necessary to conduct situational training exercises to ensure understanding).
- Concealment, including use of urban areas and camouflage.
- Cover for fighting positions and protective shelters.
- Vehicle revetments, transitory vehicle dismount points, and parking areas.
- Protective wire barriers.
- Prepared defensive, alternate, and supplementary positions.
- Prepared routes for supply and evacuation.
- Minefields to cover avenues of approach, if approved for use. Adherence to correct procedures makes mine recovery less dangerous when it is time to displace. Minefields must be observed.
- Prepared sleep areas that are dug in or revetted to protect against enemy direct or indirect fires.
- Listening posts (LPs)/observation posts (OPs) covering approaches. These positions must be prepared so they cannot be seen when approached from the front.
- Devices such as ground surveillance radar, personnel detection devices, and field expedients to enhance early warning of enemy approach or infiltration.
- Crew-served weapons emplaced to cover suspected avenues of approach. Cleared fields of fire.
- Wire and directional antennas to prevent detection by enemy electronic warfare elements.
- Air and ground patrols to inhibit observation and attack. Returning aircraft should be given patrol areas to survey before landing. Ground patrols should conduct reconnaissance as required to detect enemy observers or civilians who may be enemy informants.

- Daily stand-to to establish and maintain a combat-ready posture for combat operations on a recurring basis. Stand-to includes all steps and measures necessary to ensure maximum effectiveness of personnel, weapons, vehicles, aircraft, communications, and CBRN equipment. Units assume a posture during stand-to enabling them to commence combat operations immediately. Although stand-to is normally associated with begin morning nautical twilight, unit operations may dictate another time.

Airfield Services

3-72. The airfield services element develops local airfield procedures; assists the SO in development of the local hazards map, preaccident plan, crash/rescue system; and formulates needed LOAs and OLs. This element develops airfield SOPs and tactics, techniques, and procedures necessary to ensure safe and effective operations. Airfield services coordinate through the TAOG any personnel and equipment required for services not organic to the AOB (refuel services, crash rescue/firefighters, air force weather personnel, and airfield lighting).

3-73. The airfield services element establishes communications, automation connectivity, and interoperability with other systems on the airfield and supported aviation units. This is accomplished through the use of the internal communications section, to the extent possible, of the AOB. Additional communications support is coordinated through the signal support chief of the TAOG S-6 section.

3-74. Sustaining airfield operations requires trained maintenance personnel, and an ample supply of spare parts and power as well as personnel life support considerations. The airfield services element must develop contact lists for long-term airfield support requirements, which can be acquired through the corps or area support system once the TAOG establishes formal support agreements with those agencies.

Petroleum, Oil and Lubricants Services Section

3-75. The POL section refuels appropriate Army and joint aircraft. Because this section is not organic to the AOB, POL assets are coordinated through the TAOG and provided by the appropriate TSC/ASCC.

Engineer Fire-Fighting Team

3-76. Engineer fire-fighting teams provide fire prevention/fire protection; aircraft crash rescue, natural cover, and hazardous-material incident responses within a theater of operations. The number and types of fire fighting teams needed to protect an AO depend on the type of facilities within that AO. Engineer fire-fighting teams are organized into headquarters and fire truck teams (figure 3-9).

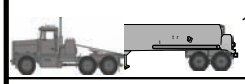
Equipment	Personnel	Commo
Fire Fighting Teams	Headquarters Team	
 1-T61494 Truck 4X4 HMMWV	1-21B WO Fire Marshall 1-21M4 E7 Fire Chief 1-21M3 E6 Fire Inspector 1-63B1 E4 Wheel\Ve Mec	R6804 – VRC-90 Z5986 – DAG
Fire Fighting Teams	Fire Fighting Team	
 1-T61494 Truck 4X4 HMMWV	1-21M3 E6 Fire Team Chief	R6804 – VRC-90 Z5986 – DAG
 1-D28318 Distr 1-T91656 Truck LET 66000	1-21M1 E4 Fire FT CSH Rescue Sp 1-21M1 E3 Fire Fighter	R6804 – VRC-90 Z5986 – DAG
 1-Z4202 Trk Tactical Fire	1-21M2 E5 Lead Firefighter 1-21M1 E4 Fire FT CSH Rescue SP 2-21M1 E3 Fire Fighter	R6804 – VRC-90 Z5986 – DAG

Figure 3-8. Headquarters and fire truck teams

3-77. The headquarters team provides C2 and coordination for engineer fire-fighting teams. It also supervises rescue and fire-fighting operations, while fire truck teams provide fire-fighting, crash extraction, prevention programs, and first aid for logistic support areas (LSAs), ISBs, FOBs, and major facilities.

Weather Services

3-78. Air Force meteorological and oceanographic (METOC) organizations provide support to Army component and subordinate elements. METOC organizations provide surface-based observations (clouds, visibility, winds, pressure, temperature, and ground conditions), upper air observations (temperature, winds, and humidity), satellite data, and space environmental forecasts and observations. Air Force combat weather teams use tactical equipment to receive satellite imagery, measure atmospheric weather parameters, and generate forecast products. Service requests for theater airfield weather requirements are processed through the TAC or ASCC general staff intelligence section.

JOINT INTERDEPENDENCE

3-79. Joint forces provide additional capabilities in construction and engineer services, airfield management, and ATS. Airfields that support joint operations must share operational responsibilities for base support. Time-phased force and deployment data addresses requirements for support of airfields. In some cases, it is essential that other military services augment initial key areas such as fire protection, utilities, power generation, and environmental services.

3-80. During combat operations, effective and efficient use of limited airfield capacity and resources is critical to mission success. Foreign airfields hosting a variety of allied military, host nation, and commercial air activities complicate this task. To achieve unity of effort for United States forces operating on a JIIM airfield, the geographic combatant commander must appoint a single on-scene commander to determine operational priorities among competing demands. United States military forces should designate a single point of contact to negotiate airfield usage issues with JIIM airfield commanders and managers.

UNITED STATES NAVY

3-81. The naval construction force, organized primarily as Navy construction engineer units, perform both generalized and specialized construction missions in support of Navy and Marine Corps component commanders. These units provide construction support for the establishment of forward logistic support sites. In addition, naval construction battalions have extensive vertical construction capabilities. They can also be tasked to construct roads and bridges for supply routes, construct or extend airfield pavements, establish ammunition supply points, and build expeditionary airfields and advanced bases.

UNITED STATES MARINE CORPS

3-82. The Marine Corps is an expeditionary force-in-readiness. Marine Corps engineers, by nature of their organization and mission, focus on expeditionary engineering for essential aviation ground support requirements. The combat engineer battalion conducts mobility, countermobility, and survivability operations in support of Marine divisions.

3-83. The Marine Corps aviation ground support (AGS) element commands and controls expeditionary airfield support services for its aviation assets. Functions such as construction, aircraft rescue and fire-fighting, aircraft refueling, and weather services are organic to the AGS. These functions allow the Marine Corps and Navy to project their assets ashore and generate sorties at a rate beyond their sea-based platforms.

3-84. The Marine Air Traffic Control Detachment (MATCD) is the principal terminal ATC organization within the Marine Corps. Three MATCDs are structured to operate as subordinate elements of the Marine air control squadron and typically deploy as part of a Marine air ground task force. Each MATCD is organized and equipped to provide continuous all weather ATC services to an independent and geographically separated main air base or air facility, FOB, or other remote air sites or points. A MATCD

is composed of a command, maintenance, tower, and radar control section. Each section has personnel and equipment capable of sustaining ATC operations within an amphibious objective area.

UNITED STATES AIR FORCE

3-85. Air Mobility Command has two contingency response wings (CRWs), formerly know as the continental United States (CONUS) Air Mobility Operations Groups (AMOGs). CRWs are organized, trained, and equipped to provide three deployable contingency response groups (CRGs). The CRW as an organization does not deploy, however it provides the resources for and coordinates the deployment of subordinate units to provide deployable elements of C2, aircraft maintenance, and aerial port personnel, Additionally, air mobility liaison officers are normally assigned to the CRWs, though they are attached and move with their associated ground units.

3-86. CRGs deploy in order to assess, open, and initially operate airfields. The groups consist of a standardized force module dedicated to the airfield opening task. This module includes a tailored section of all forces needed after seizure, or handoff from seizure forces, to assess an airfield, establish initial air mobility, C2, and operate the flow of air mobility into and out of that airfield. CRGs may open an airfield for the Air Force, another Service, or even a coalition partner. To ensure continuity of operations, CRGs coordinate planning agreements with the theater Commander of Air Force Forces (COMAFFOR)/JFACC staff.

3-87. Contingency response elements (CREs), formerly known as tanker/airlift control elements, are mobile organizations responsible for providing continuous onsite mobility operations management. Commanded by a commissioned officer, CREs deploy to provide air mobility mission support when command and control, mission reporting, and/or other support functions are required. CREs provide aerial port, logistics, maintenance, weather, medical, and intelligence services as necessary.

3-88. Mission support teams (MSTs) perform a similar function as a CRE but on a smaller scale. MSTs are normally led by a noncommissioned officer and provide a level of command and control, aerial port, and maintenance services capable of supporting a limited number of aircraft.

3-89. Air Force engineer units, organized as PRIME BEEF or RED HORSE, provide expeditionary civil-to-general engineering support across the range of military operations, including airfield engineer and construction operations.

3-90. Air Force deployable air traffic control and landing system (DATCALS) teams provide equipment and personnel to support terminal area flight operations. DATCALS are designed to ensure a safe, flexible use of terminal airspace. These teams provide continuity of control with the theater air control system and air base defense forces. General-purpose DATCALS and airfield operations personnel provide terminal area and airfield support from austere to fully supported host nation airfields with mobile tower, surveillance radar, and precision landing system, terminal NAVAIDs, and space/ground capabilities or any combination of the above.

SECTION III – STABILITY AND CIVIL SUPPORT OPERATIONS

3-91. Stability and civil support operation missions of the TAOG, AOBs, and ATS companies are similar to combat missions. Requirements are based on scale and operational environment, the supported agency or unit, and necessary interfaces. TAOG units, along with National Airspace System resources, are used frequently during civil support operations. In this role, TAOG units coordinate and integrate Army airspace user requirements into the nation's airspace system. TAOG planners and airspace users coordinate and integrate airspace requirements as necessary to permit freedom of movement to accomplish their mission. Civil support and stability operations primarily focus on—

- Disaster relief.
- Department of Homeland Security missions.
- Counter-drug operations.
- Reconstruction or restoration of essential services (air traffic) and governance.

3-92. Joint, combined, or interagency personnel may share ATS facilities. When Army aviation performs sustained high-density operations from a joint-use airfield or landing area, the TAOG commander must consider providing airfield management, airfield operations, and ATC personnel for the purpose of joint manning. The TAOG, AOB, and ATS commanders coordinate with these joint personnel to determine employment requirements and conditions in these facilities. Joint manning LOAs must be developed among all concerned parties.

3-93. Stability operations outside of the borders of the United States that involve TAOG support in interagency airspace infrastructures require careful attention to preserve the sovereignty of the host nation. While services provided remain the same, the location of TAOG assets may differ. The focus remains on the continued security and sovereignty of the supported country during these operations. TAOG activities may at some point shift to the support of aviation retrograde operations at debarkation points. TAOG units often execute these functions in host nation airspace; therefore, commanders must ensure that personnel are trained to host nation or ICAO as well as United States Army standards.

DISASTER RELIEF

3-94. TAOG and ATS units deployed for disaster relief operations in the continental United States (CONUS) are required to coordinate airspace in accordance with joint task force ACP In this capacity, military units are concerned with the coordination of air and ground operations to facilitate relief supplies and effects.

3-95. During disaster relief operations, outside the continental United States (OCONUS) civilian and military agencies of the United States participate in actions taken by another government. These agencies support the host nation making it the primary agent in most actions. If the host nation requests support, United States national command authorities may direct the military to participate. In this environment, airspace control focuses on establishing relief airfields and coordinating military airspace requirements with host-nation civil air operations. The expanded use of TAOG and ATS units during these operations can provide greater positive control of airspace.

3-96. Air traffic regulations and control of civil and military airspace users is the basis for airspace control. In host-nation disaster relief efforts, the ATC system often provides the framework for most airspace control functions. The airspace control system may require some adjustment depending on the situation. Bilateral and international agreements often establish regulatory guidance affecting the use of airspace and the conduct of air traffic activities. National sovereignty and host nation laws and procedures receive first consideration. Where these procedures do not support military operations, training must be conducted or host nation capabilities augmented with equipment, personnel, or both. Any required changes or waivers to national regulations or problems resulting from restrictions to military operations are sent to the JFC.

3-97. In disaster relief operations, TAOG and ATS units may use more positive control then procedural control, contributing directly to the identification of aircraft for the host nation airspace system. Strict host nation laws may require TAOG and ATS units maintain continuous communications during every aviation mission, making it critical that unit personnel are trained and proficient in ICAO rules and procedures.

HOMELAND SECURITY OPERATIONS

3-98. Terrorism counteraction operations prevent enemy insurgent acts by protecting personnel, units, and facilities. The measures adopted and carried out by command directives dictate how to use airspace and perform airspace control functions. These operations somewhat overlap all aspects of military operations. Measures taken to counter terrorism can impact TAOG and ATS units and operations ongoing at air terminals, aerial ports, and Army airfields and heliports. Restricted use of areas around sensitive facilities is commonplace.

3-99. Drug trafficking is a true form of low intensity conflict (LIC). Likewise, counter-drug operations and LIC operations are closely associated. ATS organizations may be tasked to support the Department of Homeland Defense for support of nontraditional missions associated with radar surveillance.

RECONSTRUCTION AND RESTORATION OPERATIONS

3-100. Air traffic operations conducted under this category restore the air transportation system and usually involve civil-military actions to reestablish essential services. To establish a stable operational environment, stability operations capitalize on coordination, cooperation, integration, and synchronization of nonmilitary organizations. The United States government often conducts stability operations through a combination of peacetime developmental cooperative activities and coercive actions in response to crisis.

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Chapter 4

Training and Readiness

Training for warfighting will always remain the top priority for the Army. Warfighting readiness is derived from tactical and technical competence and from confidence in individual and unit skills. Competence relates to the ability to fight doctrine through tactical and technical execution. Confidence is the individual and collective belief that one can do all things better than one's adversary, and possesses the trust and will to accomplish the mission.

SECTION I – TRAINING OVERVIEW

Contents

4-1. The intent of this chapter is to provide a linkage of the training fundamentals of ATS units to other aviation units within the aviation brigade. Much like the aircrew training program of aviators, air traffic controllers and ATS maintenance personnel complete a similar training program to reach technical and tactical qualification. Battle-focused training principles (outlined in FM 7-0, FM 7-1, and combined arms training strategies [CATS]) assist commanders with developing, managing and administering comprehensive air traffic training programs (ATTPs) and ATS Maintenance Training Programs (AMTPs). ATTPs and AMTPs reflect an assembly of training requirements organized to fulfill the broad, overall training goals of aviation commanders supervising certified and non-certified air traffic and air traffic maintenance personnel.

4-2. Aviation operations require worldwide strategic and tactical mobility. As a fully integrated member of the combined arms team, aviation forces conduct a wide range of tasks across the spectrum of conflict and during stability operations. ATS units enable aviation to operate in complex surroundings and are key to the mitigation of risk often present within hazardous operating environments. Integrating ATS teams with other aviation units within the brigade is critical in ensuring ATS assets are exercised and trained to meet wartime task proficiency.

4-3. The ATTP and AMTP are the commander's programs for training combat-ready air traffic controllers and air traffic maintenance personnel. This training covers task proficiency at the individual level, to team proficiency, and finally to unit proficiency in executing mission-essential tasks necessary to accomplish joint and combined arms operations as defined in the Army universal task list. Commanders should construct ATTPs and AMTPs to include—

- Benefits to be gained through standardization.
- Objectives to be achieved.
- Procedures or actions to be standardized, described in detail.
- Specific plans for implementation.
- Effective procedures for enforcement.
- Delineated responsibilities.

4-4. Commanders use publications such as Army training and evaluation program (ARTEP)/mission training plan (MTP) publications, FM 3-04 series, FM 7-0, FM 7-1, and CATS to develop the unit's ATTP. The first step in this process is an evaluation of the unit's METL to determine training requirements.

4-5. The ATTP and AMTP are the ATS commander's training program. However, warrant officer and NCO leaders and trainers are the primary unit personnel tasked with implementing the ATTP and AMTP, especially at the individual and team levels.

4-6. As the commander develops the training programs, input from the unit's implementers is vital. Warrant officer and NCO implementers advise the commander on required tasks, applicability of team tasks to unit roles and METL-based missions, geographical factors which affect training and operational employment, training assets, and recurring training issues.

4-7. After analysis of the unit METL, implementer input, and higher commander's guidance, commanders develop a supporting individual commander's task list (CTL) for each air traffic team member. Commanders will then establish a short-range, long-range and near-term training plan to ensure ATS teams gain and maintain proficiency in unit collective tasks. Implementers must be familiar with the commander's training intent and with the training plans to implement the objectives of the ATTP and AMTP.

4-8. Units are trained to be combat ready through realistic and challenging training. At every level, commanders must train to Army standards. Battle focus enables commanders to plan and execute training that produces tactically proficient units for success on the battlefield. Using the Army training management cycle, the commander continuously plans, prepares, executes, and assesses the state of training in the unit. This cycle provides the framework for commanders to develop their unit's METL, establish training priorities, and allocate resources.

4-9. Commanders and leaders at all levels use the principles of training to develop and execute effective training. As commanders train their units on METL tasks, senior commanders reinforce training by approving and protecting training priorities and providing resources.

BATTLE-FOCUSED TRAINING

4-10. Battle focus, as described in FM 7-1, is a concept used to derive peacetime training requirements from assigned missions. The priority of training in units is to train to standard on the wartime mission. Battle focus guides the planning, preparation, execution, and assessment of each organization's training program, ensuring its members train as they fight. Battle focus is critical throughout the entire training process and used by commanders to allocate resources for training based on wartime and operational mission requirements. Battle focus enables commanders and staffs at all echelons to structure a training program that copes with nonmission-related requirements while focusing on mission essential training activities. It recognizes a unit cannot attain proficiency to standard on every task whether due to time or other resource constraints. Commanders achieve a successful training program by consciously focusing on a reduced number of critical tasks essential to mission accomplishment. A critical aspect of battle focus is to understand the responsibility for, and linkage between, the collective mission essential tasks and individual tasks supporting them.

4-11. Aviation commanders and their subordinate leadership must be well versed in the battle tasks across the warfighting functions for the specific task force. Leaders must make conditions in training as close to wartime conditions as possible. Innovative leaders seize the opportunity to increase training challenges for Soldiers, leaders, and units. Successful completion of each training event increases the capability and motivation of individuals and units for more sophisticated and advanced training. This is the commanders' continuous quest. ATS training principles are not very different from aviation and other combat arms branches; however the impact of operating in the third dimension with complex systems requires that unique considerations be given to developing and maintaining proficiency at the individual, team, and collective levels.

SECTION II – AIR TRAFFIC TRAINING PROGRAM

ATTP PROGRESSION

4-12. AR 95-2 establishes procedures, policy, responsibilities and standardization requirements for ATC training programs. The status of ATS unit training depends upon the status of individual/team/collective training. Individual, team, and collective proficiency must be balanced by ensuring training resources are used to train both at the individual and collective proficiency level. Readiness levels (RLs) correlate a Soldier's proficiency level and mission readiness.

4-13. RL training begins with development of proficiency at the individual level and progress through team to collective proficiency. This process follows the crawl-walk-run model of training. Tasks required for air traffic controllers to progress from various levels are contained within the Soldier's CTL. CTL requirements are battle-focused, tasked-based requirements derived from the unit's METL and appropriate ATTP for the air traffic system the Soldier is assigned to or training on. In some cases, air traffic controllers may have more than one RL. For example, controllers who are RL-1 in their assigned ATS system may be RL-3 or RL-2 in other ATS systems within the unit. The following guidelines should be utilized when assigning RLs to air traffic controllers and assessing ATTP progression.

READINESS LEVEL-1

4-14. Air traffic controllers are awarded RL-1 upon completion of all ATTP training requirements. This phase culminates with an ATC certification or controller evaluation in accordance with AR 95-2 and appropriate FAA orders. A controller awarded this RL has been determined to possess the necessary tactical and technical skills to perform duties at the full performance level. Controllers should be removed from RL-1 and identified RL-2 when additional training is warranted due to a lack of proficiency or when individual currency requirements have exceeded guidelines.

READINESS LEVEL-2

4-15. Air traffic controllers are awarded RL-2 when undergoing advanced ATS system training at the team level and the required CTLs for RL-1 have not yet been met. This RL is characterized with proficiency in collective tasks and team tasks associated with the advanced operation of ATS systems. Tasks are performed in complex varying environments and require successful coordination and integration of combined arms operations. Advanced air traffic control procedures for the safe operation and handling of aircraft during all phases of tactical operations are a critical element of this level. Controllers possessing a previous ATC certification on the same ATS system may be awarded this level through the commander's evaluation processes discussed later in this chapter. Controllers will remain at RL-2 until all RL-1 level provisions have been met and ATC certification has been successfully completed.

READINESS LEVEL-3

4-16. Air traffic controllers are awarded RL-3 when they have completed an MOS awarding ATC school, and/or are assigned to an ATS system for which they have not previously obtained an ATC certification. This RL is characterized with the individual task proficiency in the installation, operation, and operator's maintenance of air traffic systems. This phase reinforces basic ATC procedures in controlled training and limited aircraft traffic environments. A controller assigned this RL is under the direct supervision of leaders and trainers of the ATS unit.

READINESS LEVEL-4

4-17. Air traffic controllers are awarded RL-4 when ATTP progression is not required or has been temporarily suspended due to the following—

- Controller is assigned to a staff position not requiring ATTP progression and/or development.
- Controller is medically grounded/pending medical disqualification.

- Controller is pending MOS reclassification/chapter actions.
- Controller is assigned to a National Guard position without being a graduate of an approved ATC school.

COMMANDER'S EVALUATION

4-18. The commander's evaluation provides an opportunity to conduct an assessment of newly assigned air traffic controllers and allows the association of a higher RL due to previous air traffic system certifications. This evaluation consists of a records review by the commander or his designated representative within 30 days after the controller is assigned to the unit. Provided that the controller successfully completed all phases of an ATTP in the same ATS system, he/she may be initially designated RL-2. The following guidelines apply:

- Graduates of an ATC school who are on their first unit of assignment may not be awarded RL-2 based solely on a commander's evaluation .
- Previously certified air traffic controllers may not be awarded RL-2 if more that 12 months have passed since assignment to that air traffic system.
- Controllers may not be assigned RL-1 based upon a commander's evaluation. RL-1 will only be awarded after the successful completion of CTL and training requirements contained within the unit's ATTP. RL-1 may only be awarded upon successful completion of an ATS system certification/rating or an over-the-shoulder evaluation by the ATS examiner.

ATTP FORMS AND RECORDS

4-19. The ATTP records system provides commanders with a comprehensive performance record on each air traffic controller in their unit. The following forms are used to document air traffic controller training and proficiency:

- **DA Form 3479-R** (*Training and proficiency record for the air traffic controller)*. These records provide a chronological listing of ATC certifications and ratings throughout the controller's career.
- **DA Form 3479-1-R (***Trainee/controller Evaluation).* This form is used for the documentation of written evaluations of a controller's training progress and job performance.

SECTION III – ATS MAINTENANCE TRAINING PROGRAM

4-20. Much like the unique training requirements of air traffic controllers, ATS maintainers of air traffic units require special consideration to achieve task proficiency. The United States Army ATC maintenance certification program establishes uniform standards for measuring technical proficiency of ATC maintenance technicians. It also ensures technical competence of all maintenance personnel with direct responsibility for safe operation of systems/subsystems/equipment critical to air navigation and ATC. The program establishes procedures for documenting technician proficiency, granting authority, and assigning certification responsibility. This guidance applies to DA civilians, local national civilians, and military personnel who perform maintenance on Army-owned ATC equipment. Contractor personnel are prohibited from certifying United States Army NAVAIDs. Contractor personnel may repair and verify NAVAIDs are operating properly, but NAVAID certification is an inherent governmental function.

4-21. Responsibility for the certification program is shared by examiners and various other maintenance chiefs and supervisors. Shared responsibilities include—

- Providing overall direction to and guidance on the program.
- Identifying and specifying theory and performance requirements.
- Standardizing, evaluating, and updating all phases of the program.
- Developing, validating, reviewing, and revising theory and performance examinations.
- Determining systems to be added or deleted from the program and informing appropriate individuals/elements.

- Printing and distributing examinations and certificates.
- Resolving comments, questions, and disputes regarding examinations.
- Maintaining database files containing complete verification records.
- Designating examining officials (in writing) and coordinating with the examiner regarding examination administration.
- Determining acceptability of formal schools.
- Maintaining files containing complete certification and related training records on each technician.
- Providing the technician with training materials needed to accomplish comprehensive training on the systems/subsystems/equipment.
- Requesting theory and performance examinations.
- Developing and documenting on-the-job training on site-specific systems/subsystems to support the certification program.
- Advising the commander on the status of ATS maintenance certification.
- Coordinating with the ATC facility maintenance chief for NOTAMs if training is required on any in-use operational system/subsystem/equipment.
- Conducting and recording annual reviews and proficiency assessments on DA Form 3479-9-R and DA Form 3479-10-R.

AMTP PROGRESSION

4-22. RL training begins with development of proficiency at the individual level and progress through team to collective proficiency. This process follows the crawl-walk-run model of training. Tasks required for air traffic maintenance personnel to progress from various levels are contained within the Soldier's CTL. CTL requirements are battle-focused, tasked-based requirements derived from the unit's METL. The following guidelines should be utilized when assigning RLs to air traffic maintenance personnel and assessing AMTP progression.

READINESS LEVEL-1

4-23. Air traffic maintenance personnel are awarded RL-1 upon completion of all AMTP training requirements. RL-1 is awarded to ATS maintenance personnel who have successfully completed maintenance training on all ATS systems present within the ATS unit. An ATS maintainer awarded this RL has been determined to possess the necessary tactical and technical skills to perform duties at the full performance level. ATS Maintainers should be removed from RL-1 and identified RL-2 when additional training is warranted due to a lack of proficiency.

READINESS LEVEL-2

4-24. ATS maintenance personnel are awarded RL-2 when undergoing advanced ATS system training at the team level and the required CTLs for RL-1 have not yet been met. This RL is characterized with proficiency in collective tasks and team tasks associated with the advanced maintenance of ATS systems. ATS maintenance personnel are awarded this RL when they have achieved certification on at least one ATS system of the unit. Tasks are performed in complex varying environments and require successful coordination and integration of combined arms operations. Advanced maintenance procedures during all phases of tactical operations are a critical element of this level. ATS maintenance personnel will remain at RL-2 until all RL-1 level provisions have been met and maintenance certification has been successfully completed on all ATS systems of the unit.

READINESS LEVEL-3

4-25. ATS maintenance personnel are awarded RL-3 when they have completed an MOS awarding school, and/or are on initial assignment to an ATS unit and have not achieved maintenance certification on any ATS systems of the unit. This RL is characterized with the individual task proficiency in the installation, operation, and unit level maintenance of air traffic systems. This phase reinforces basic maintenance

procedures and theories. A maintainer assigned this RL is under the direct supervision of leaders and trainers of the ATS unit when performing maintenance actions.

READINESS LEVEL-4

4-26. ATS maintenance personnel are awarded RL-4 when AMTP progression is not required or has been temporarily suspended due to the following—

- Maintainer is assigned to a staff position not requiring AMTP progression and/or development.
- Maintainer is pending MOS reclassification/chapter actions.
- Maintainer is assigned to a National Guard position without being a graduate of the 94D school.

COMMANDER'S EVALUATION

4-27. The commander's evaluation provides an opportunity to conduct an assessment of newly assigned ATS maintenance personnel and allows the association of a higher RL due to previous air traffic system certifications. This evaluation consists of a records review by the commander or his designated representative within 30 days after the maintainer is assigned to the unit. Provided that the controller successfully completed all phases of an AMTP in the same ATS system, he/she may be initially designated RL-1 or RL-2. Commanders should utilize practical hands-on assessments to confirm proficiency levels of maintainers. The following guidelines apply:

- Graduates of MOS 94D school who are on their first unit of assignment may only be awarded RL-3 until they have successfully completed maintenance certification on at least one ATS system .
- Previously certified ATS Maintenance personnel may not be awarded RL-1 if more that 12 months have passed since direct maintenance actions have been performed on all ATS systems of the present unit.
- ATS maintenance personnel will not be designated RL-1 until they have achieved maintenance certification on all ATS systems of the present unit.
- While commanders may designate previously certified maintainers as RL-1, careful consideration must be given to past certifications as they relate to the current unit of assignment. Recency, task assessment/comparison, and experience level must be assessed before designating maintenance personnel RL-1.

AMTP FORMS AND RECORDS

4-28. The AMTP records system provides commanders with a comprehensive performance record on each ATS maintainer in their unit. The following forms are used to document ATS maintainer training and proficiency:

- **DA Form 3479-9-R** (*ATC Maintenance Personnel Certification and Related Training Record*). This record provides a chronological listing of ATS system certifications throughout the maintainer's career.
- **DA Form 3479-10-R (***Responsibility Assignment*). This form documents proficiency and maintenance responsibilities of ATS systems within the unit.

SECTION IV – UNIT STATUS REPORTING

GENERAL

4-29. The two primary Army regulations governing readiness reporting are AR 220-1 and AR 700-138. Although this section of this publication deals primarily with training, a commander must be intimately familiar with both of these regulations. The unit status report (USR) provides the commander with a snapshot of the unit's overall training and equipment status. The commander determines the unit's overall status based on an assessment of the units capability to accomplish the assigned mission. The commander's responsibilities listed in AR 220-1 include—

- Maintaining the highest unit status level possible with given resources.
- Reviewing subordinate unit reports for accuracy and compliance with applicable requirements.
- Distributing unit equipment and resources against mission essential requirements on a priority basis.
- Training to the highest level possible with available resources.
- Submitting the unit's status between regular reports, as required.
- Ensuring the unit has computer hardware/software to process and submit the USR.

4-30. A unit's C-level indicates the degree to which the unit has achieved prescribed levels of fill for personnel and equipment, the training status of those personnel, and the maintenance status of its equipment. Detailed procedures for reporting C-level are contained in AR 220-1.

ASSESSING AND REPORTING UNIT PROFICIENCY

4-31. As indicated earlier, the unit's METL is derived from an analysis of the assigned wartime missions and is approved by its next higher headquarters in the reporting chain of command. The commander, at all levels, assesses the unit's ability to execute mission essential tasks to standard. Commanders consider the unit's ability to perform in unique operational environments as required by the unit's METL. When assessing ATS unit proficiency, commanders use personal observations, records, reports and the assessments of others (internal and external to the unit). The commander considers the demonstrated proficiency of subordinate elements, leaders, and Soldiers; and the availability of critical resources required to support METL training as follows:

- The unit and organic sub-elements demonstrate proficiency during external evaluations of ARTEP/MTP standards; deployment at collective training centers; emergency deployment readiness, field training, CP, combined arms live-fire, and operational readiness exercises; and other training events described in the unit's CATS. Proficiency is measured in terms of the unit's demonstrated ability to perform the tasks as stated in the approved METL, including supporting tasks not specified in the METL but necessary for performing METL tasks. Proficiency is judged on the performance of these tasks to standard. Full METL proficiency is achieved when a unit has attained a trained/T level of proficiency in all METL tasks as defined in FM 7-1. Sustaining proficiency then becomes the commander's challenge.
- Leader qualification includes not only those areas of training required by their base branch, but also those areas required by professional leadership development programs supporting the unit's mission.

4-32. In addition to maintaining a minimum number of qualified air traffic controllers and ATS maintenance personnel to perform most of the critical warfighting tasks to standard, commanders must satisfactorily accomplish collective training events as defined in the appropriate CATS. Commanders perform T-level assessments per AR 220-1 to review and confirm the results of their T-level assessments in light of their unit's accomplishments during critical training events. The T-level rating provides meaningful information for the entire chain of command. The ATS unit training T-level is a major factor in determining how many days the unit needs to train to standard on METL tasks. Additionally, this T-level provides an indicator to the aviation commander and staff on aircraft support requirements to achieve training goals of the ATS company. Commanders use the number of days the unit needs to train to standard

METL tasks, along with the information in AR 220-1 to determine the overall T-level. The following guidelines apply to T-level requirements for ATS units—

- **T-1**. At least 85 percent of air traffic controllers and ATS maintenance personnel are RL-1.
- **T-2**. At least 65 percent of air traffic controllers and ATS maintenance personnel are RL-1.
- **T-3**. At least 50 percent of air traffic controllers and ATS maintenance personnel are RL-1.
- **T-4.** Less than 50 percent of air traffic controllers and ATS maintenance personnel are RL-1.

4-33. The use of RLs does not supersede ATC training time limitations or rating/certification system requirements detailed in AR 95-2, FAA orders, and other appropriate maintenance and air traffic control guidelines. Commanders and examiners should develop ATTPs and AMTP's consistent with training time limitations contained within these documents.

4-34. The guidelines detailed should serve as a training indicator for controller and ATS maintenance personnel qualifications as they relate to the units overall ability to accomplish assigned mission(s). Commanders and leaders must continually assess the environment and make determinations on individual skill proficiency required to safely execute aviation operations. Commanders should always consider minimum operating requirements and maximum hours of operation (fighter management/crew rest) for the safe operation of air traffic systems.

SECTION V – ADDITIONAL TRAINING CONSIDERATIONS

4-35. ATS leaders must keep in mind ATC skills are a challenge to train in tactical ATS units and extremely perishable. The crew-level training progression of the aviation brigade does not inherently support the traffic density requirements to train and sustain air traffic controllers of many ATS units. It remains critical that ATS leaders maximize opportunities to participate in the collective training events of the aviation brigade.

4-36. ATS leaders should explore other training opportunities with installation ATC facilities within their geographical area. ATS units fostering relationships and training opportunities with installation ATC facilities are uniquely better prepared to execute ATS operations in heavy air traffic environments. Likewise, ATS maintenance should not be excluded from installation training partnerships. Training on the NAVAIDs and radio systems employed by installation ATC facilities may significantly increase the skills and abilities of ATS maintainers.

Chapter 5

Maintenance Operations

Repairing equipment far forward enhances the ability to quickly return the maximum number of systems at the earliest opportunity. The concept of replacing components and modules instead of repairing them is a key element in the logistic support and maintenance operations of all modern ATS systems. This concept leverages advanced prognostics and diagnostic tools, support equipment, and training of ATS maintainers.

SECTION I – UNIT-LEVEL MAINTENANCE

5-1. The COMNAV maintenance section of the GSAB ATS company and AOB are the maintenance enablers of the air traffic mission area. ATS maintainers not only execute field-level maintenance, but also perform sustainment-level maintenance actions on air traffic systems. This unique replace and fix forward capability ensures critical systems are available to accomplish the multitude of ATS missions assigned to air traffic organizations. Figure 5-1 illustrates the COMNAV section organized under the GSAB ATS company and AOBs.

Contents

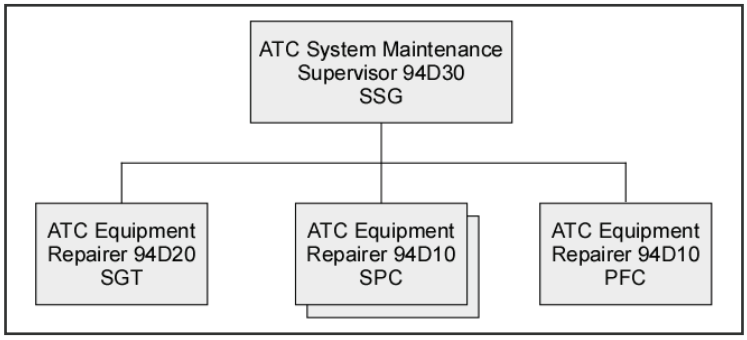

Figure 5-1. COMNAV section

TWO-LEVEL MAINTENANCE OPERATIONS

5-2. During the past decade, the United States Army has been engaged in a deliberate and seeping effort to adapt its organizations, Soldiers, equipment, and methods or operations to requirements of a rapidly changing strategic and technological landscape. The power of advanced technologies, especially information technology, enables the Army to achieve situational dominance and decision-making momentum, creating a new construct for the application of force.

5-3. The Army vision calls for transforming from a forward-deployed force to a strategically responsive force projection Army. Today's reactive maintenance system creates a large battlefield logistical footprint reliant on multiple headquarters to coordinate forward support activities and evacuation of inoperative

systems. The current methodology of "fix forward" is changing to a "replace forward-repair rear" methodology. Clearly, the skills and abilities of our ATS maintainers executing this shift in doctrine will also change.

5-4. The air traffic maintenance program is aligned with the Army maintenance system detailed in AR 750-1 and FM 4-30.3. Unique to the ATS maintenance strategy is the alignment of repair functions for both field and sustainment-level maintenance. Field maintenance, also known as on-system maintenance, is primarily associated with repairs that return equipment to operators. Sustainment maintenance, also known as off-system maintenance, primarily repairs and returns equipment to the supply system. Each of these functions is supported by ATS maintainers.

5-5. ATS maintainers perform the following maintenance actions under field maintenance—

- Preventive maintenance checks and services (PMCS).
- Inspections by sight and touch of accessible components per the TM XX-10 series and condition-based maintenance indicators or instrumentation.
- Lubrication, cleaning, preserving, tightening, replacement, and minor adjustments.
- Limited diagnosis and fault isolation.
- Replacement of combat spares.
- Requisition, receipt, storage, and issue of repair parts.
- Evacuation to the appropriate maintenance support activity of unserviceable reparables.
- Coordination and transportation of ATS systems.
- Materiel readiness reporting.
- Fabrication as identified by the appropriate TM.

5-6. ATS maintainers perform the following maintenance actions under sustainment maintenance—

- Inspection, diagnosis, isolation, and repair of faults within modules and components.
- Turn-in of unserviceable end items and components through the appropriate supply activity.
- Fabrication or manufacture of repair parts, assemblies, components, jigs, and fixtures.
- Equipment modifications as required by AR 750-10.
- Manufacturing of end items and parts not provided or stocked by the national supply system.
- Special inspections and modifications of equipment requiring extensive disassembly or elaborate test equipment.
- Nondestructive testing to determine the acceptability of removed parts.
- Installation of all outstanding modification work orders and minor alterations directed by the materiel proponent.
- Postproduction software support, the sustainment of the operational software embedded in weapon systems after closure of the production line.

Note: In accordance with AR 750-1, modified table of organization and equipment (MTOE) ATS maintenance personnel may perform duties at table of distribution and allowances (TDA) maintenance activities to maintain skills and update MOS training.

POSITIONING MAINTENANCE SUPPORT ASSETS

5-7. The nature of the modern battlefield demands that ATS systems be repaired quickly and as far forward as possible. This requirement implies a forward thrust of maintenance within the division AO. Maintenance assets move as far forward as the tactical situation permits, repairing unserviceable and damaged ATS systems to return them as quickly as possible.

5-8. A viable maintenance system complements the capabilities of the supply system. When equipment is in short supply or unavailable to support requirements, commanders use the maintenance system to offset

the shortfall. Equipment has become complicated and technically advanced, making it easier to meet surge requirements by redirecting the maintenance effort rather than influencing the supply effort.

5-9. The job of maintenance managers is to ensure the proper mix (type and location) of maintenance that best supports the commander's tactical and operational requirements. Early movement of essential maintenance capabilities ensures that deployed ATS systems are operational upon arrival in a theater of operations.

SPLIT-BASED OPERATIONS

5-10. Split-based operations refer to performing certain logistic and maintenance functions within a given theater of operation, in more than one location. This is a principal concern of the COMNAV section due to the nature of ATS operations within the CAB and additional ATS maintenance support to the brigade aviation element and division airspace cell. By all accounts, this is the most significant challenge of the ATS COMNAV section. Commanders must develop detailed plans and support agreements between supported elements/staffs of their respective commands to ensure timely repair of ATS systems emplaced throughout the battlefield.

5-11. Strategic split-based operations refer to performing certain logistic and maintenance administrative and management functions outside the joint operations area (JOA). These functions can be performed in a secure theater location, an ISB, or home station. Soldiers and civilians can perform personnel, materiel, and distribution management functions without deploying to the JOA if standard Army management information systems (STAMIS) are adequate. The STAMIS help minimize strategic lift requirements and reduce the sustainment footprint in theater while still meeting support requirements.

CONTRACT AND CIVILIAN MAINTENANCE SUPPORT

5-12. AR 750-1, AR 70-1, and AR 700-127 contain policy guidance on the utilization and employment of contractors, DA civilians, and local national augmentation used for supporting Army operations. Specifically, AR 750-1 details the utilization of military and non-military personnel in maintenance operations with the following:

- Military personnel will perform maintenance in combat or hazardous duty areas as much as possible. The employment of civilians in hazardous duty areas for the performance of maintenance of field equipment that can be maintained by a Soldier is strongly discouraged.
- Civilians will not be permanently stationed in combat areas or hazardous duty areas as determined by the combatant commander (see AR 715-9). Civilians may travel forward to a brigade combat team operational area on a case-by-case basis as individual equipment failures occur to provide temporary onsite maintenance and technical advice (sustainment-level maintenance assistance teams and/or modification application teams).
- Outside the brigade operational area, in addition to military personnel, civilian maintenance personnel (contract, TDA, local nationals, and so on) may be acceptable as a prudent risk on the probability of maintenance services being continued in wartime and in support of other operations.

5-13. Certification is the quality control used by ATS maintainers to ensure ATS systems are operating with required parameters. Independent discretionary judgment about the provision of services, the need to separate profit motivations from operational decisions, and the desire to minimize liability, make the regulatory function of certification and oversight inherently a governmental function. Contractors and host nation augmentation will not be used in the certification or verification of ATS systems, NAVAIDS, and ATS maintenance training programs.

SECTION II – EXTERNAL MAINTENANCE ORGANIZATIONS

5-14. Sustainment maintenance support is divided and primarily performed by three separate entities: the original equipment manufacturers (OEMs), their civilian field service representatives (CFSRs), and Army depots. These Army depots, located at fixed bases in CONUS, are the national maintenance sources of

repair (SORs). Sustainment maintenance supports the supply system by economically repairing or overhauling components.

5-15. Sustainment maintenance refers to all maintenance performed on equipment above and outside of the combat aviation brigade. The OEM CFSRs may be placed within the combat aviation brigade to provide a limited forward sustainment maintenance capability. They operate out of fixed or semi-fixed facilities.

ATS MAINTENANCE COMPANY–FORSCOM

5-16. A deployable special repair activity with mobile maintenance contact teams is organized under the FORSCOM aligned Ordnance Branch. This company operates a supply support activity and provides class IX materiel support for tactical ATS systems worldwide. This organization executes general support/limited depot ATS maintenance operations in CONUS and through deployed ATS maintenance teams in the theater of operation.

UNITED STATES ARMY MATERIEL COMMAND

5-17. The United States Army Materiel Command's (USAMC's) mission is complex and ranges from developing sophisticated weapon systems to maintaining and distributing spare parts. The USAMC's mission is to provide superior technology, acquisition support, and logistics. The USAMC operates the research, development and engineering centers; Army Research Laboratory; depots; arsenals; ammunition plants; and other facilities. Subordinate commands provide specific aviation support within the USAMC structure. These commands include the United States Army Aviation and Missile Command (AMCOM) and United States Army Communications-Electronics Command (CECOM).

5-18. The USAMC—

- Overhauls and upgrades Army equipment during the reset phase of the Army force generation (ARFORGEN) process.
- Produces and provides bombs and ammunition for all military services.
- Provides on-the-ground logistics assistance to every unit in the Army.
- Provides new equipment training.
- Maintains the Army's pre-positioned stocks on land and at sea.
- Researches, develops, and acquires conventional ammunition for DOD.
- Supports acquisition of end items and parts for military weapon systems.

CECOM

5-19. The CECOM mission is to develop, acquire, and sustain superior information technologies and integrated systems. CECOM controls and operates Tobyhanna Army Depot.

5-20. This particular depot is the largest, full-service electronics maintenance facility within DOD. Its mission is total sustainment, including design, manufacture, repair, and overhaul of hundreds of electronic systems. These include satellite terminals, radio and radar systems, telephones, electro-optics, night vision and anti-intrusion devices, airborne surveillance equipment, navigational instruments, electronic warfare, guidance and control systems for tactical missiles, and BFT installation kits.

UNITED STATES ARMY AVIATION AND MISSILE COMMAND

5-21. AMCOM is a major subordinate command of the USAMC. AMCOM has direct operational control of the national maintenance SOR and two Army depots: Corpus Christi Army Depot and Letterkenny Army Depot.

NATIONAL MAINTENANCE SORS

5-22. The national maintenance manager is responsible for managing all sustainment-level reparables and selected field-level reparables according to AR 750-1. The national maintenance manager uses various sources of repair. The national maintenance program distributes sustainment maintenance workload across depot and nondepot activities based on national needs. The national maintenance program manager may establish the use of a theater aviation sustainment manager within a specific theater. The theater aviation sustainment manager provides a unified aviation maintenance life-cycle management command focused on the use of theater assets, providing airframe maintenance, overhaul of aviation subassemblies, and crash/battle damage repair.

5-23. Performance-based logistics (PBL) is a support strategy that places primary emphasis on optimizing system support to meet the needs of the warfighter. Its primary tenets are documentation of warfighter performance requirements as measurable metrics in performance-based agreements designation of single point accountability for performance with a product support integrator and development of support metrics and accompanying incentives to ensure that the performance objectives are met. In short, PBL is buying performance, not transactional goods and services. PBL delineates outcome performance goals of systems; ensures that responsibilities are assigned; provides incentives for attaining these goals; and facilitates the overall life-cycle management of system reliability, supportability, and total ownership costs. It is an integrated acquisition and logistics process for buying system capability.

5-24. Source-of-support decisions for PBL do not favor either organic or commercial providers. The decision is based upon a best value analysis or business case analysis of the provider's product support capability to meet set performance objectives.

5-25. Depot level maintenance includes the repair, fabrication, manufacture, rebuilding, assembly overhaul, modification, refurbishment, rebuilding, test, analysis, repair-process design, in-service engineering, upgrade, painting and disposal of parts, assemblies, subassemblies, software, components, or end items that require shop facilities, tooling, support equipment, and/or personnel of higher technical skills, or processes beyond the organizational level capability. Depot level maintenance can be independent of the location at which the maintenance or repair is performed, the source of funds, or whether the personnel are government or commercial (contractor) employees.

SECTION III – ADDITIONAL MAINTENANCE CONSIDERATIONS

ARMY WARRANTY PROGRAM

5-26. The Army warranty program covers all items procured for Army use purchased with an accompanying warranty. This program includes aircraft, aircraft weapon systems, ATS systems, repair parts and components. The Army also purchases warranties for items such as trucks, tractors, engines, transmissions, and construction equipment.

Note: Refer to AR 700-139 for additional guidance on the Army's warranty program.

5-27. ATS units receiving newly fielded equipment and components should check to see what type of warranty the Army purchased for their newly fielded equipment. Tailoring the warranty concept to fit the item and its intended use in a comprehensive manner with minimal effect on standard Army logistical procedures is the single most important aspect of the warranty acquisition process. Warranty tailoring is intended to protect the Army from the costs and frequency of systemic failures and to enact responsive remedies for failures of significant operational effect on aircraft readiness.

5-28. When newly fielded equipment under warranty experiences a malfunction, aviation maintenance officers/technicians should request assistance from the logistics assistant program (LAP) office for answers to or resolution of warranty issues or questions.

5-29. Logistics assistant officers (LAOs) or logistics assistant representatives provide advice and assistance to the Army command warranty claims officer (WARCO) and aviation unit maintainers as part of their service interface as established in AR 700-4. Representatives of the LAP will—

- Clarify warranty applications/exclusions and warranty claim/report procedures upon user or WARCO request.
- Provide warranty information to users/WARCOs as a secondary source of information.
- Provide specific assistance as outlined in materiel fielding plans and technical and supply bulletins/manuals and related documents for warranty management.

5-30. ATS equipment and components covered by the Army warranty program require special handling during the warranty period to keep it valid. Details concerning warranty provisions are published in supply letters. The WARCOs or LAOs will have a copy of the warranty supply letter on items within their area of support. Warranties will increase the time required to perform maintenance.

5-31. Once assistance and guidance is received from LAP technical representatives and warranty issues and concerns are addressed and resolved, aviation unit maintenance personnel shall submit a product quality deficiency report. DA Pamphlet 738-751 provides procedural guidance and information for this report.

NEW EQUIPMENT TRAINING TEAMS

5-32. The Logistics Assistance and New Equipment Training Division is one of the subordinate divisions of the Directorate for Readiness. Its mission is staff supervision and operational control of worldwide LAPs for Army ATS systems and related support equipment. The division also provides representatives to make command visits and manage all aspects of the new equipment training and support services.

ARMY TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT

5-33. United States Army test, measurement, and diagnostic equipment (TMDE) is essential to ATS maintenance due to its distinctive ability to test, adjust, synchronize, repair, and verify accuracy, safety, readiness, and information assurance of ATS systems. The capability of ATS systems, radios and communication devices to operate accurately and effectively depends on the synchronization of precise measurements against known standards.

5-34. AR 750-43 assigns management of the TMDE calibration and repair support program to Headquarters, Air Mobility Command. In turn, the TMDE activity is responsible for DA TMDE program execution and management. National Guard Bureau is assigned management, command, and control over Army National Guard (ARNG) maintenance companies and their assigned TMDE. It also controls calibration facilities at combined support maintenance shops. AR 750-43 prescribes policies and procedures, assigns responsibilities, and establishes goals and objectives applicable to the development, selection, acquisition, management, sustainment, and support of Army TMDE, associated test program sets, embedded diagnostics and prognostics, and interactive technical manuals.

Appendix A

Deployment-Redeployment Life-Cycle

This appendix addresses deployment of ground vehicles and equipment. The capability to quickly and safely deploy ATS assets from CONUS or forward-deployment sites to another theater of operation is critical. Units that plan, train, and validate movement strategies increase chances of success.

FUNDAMENTALS

A-1. Units may be required to move from any location to railheads, seaports of embarkation (SPOE), or aerial ports of embarkation (APOE) from which they will be transported to the theater of operations. Movement to the SPOE or APOE may involve a combination of modes. Depending on distance and time available, vehicles may convoy or be shipped by rail or air.

UNIT MOVEMENT PERSONNEL

A-2. Unit movement personnel develop SOPs and load plans. They train personnel, ensure equipment is prepared for movement, and inspect equipment before and after the unit deploys. They identify, request, and coordinate additional support to move unit equipment and personnel as required.

SEA AND AIR TRANSPORT

PLANNING AND PREPARATION

A-3. Successful movement depends on detailed planning SOPs for deployment by various methods and the identification, training, and validation of deployment and load teams. Each team member has specific duties, from preparation at home station, to clearance of the port of debarkation (POD), to arrival at destination. The unit must continually confirm automated unit equipment lists and time phase deployment lists in preparation for future deployments.

A-4. Upon receiving the warning order (WARNO), and time permitting, advance parties are sent to both the port of embarkation (POE) and PODs to set the conditions for reception of unit personnel and equipment and to provide command, control, communications, and intelligence.

A-5. The following references discuss deployment actions and considerations:

- The unit movement officer (UMO) deployment handbook can be download at: <http://www.transchool.eustis.army.mil>.
- FM 3-04.500.
- FM 4-01.011 (55-65).
- FM 4-01.30 (55-10).
- FM 4-01.8 (100-17-3).

A-6. Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) pamphlets provide specific guidance for preparation of equipment for movement. Download the following pamphlets from <http://www.tea.army.mil>:

- SDDCTEA Pamphlet 55-19 (Rail).
- SDDCTEA Pamphlet 55-20 (Truck).
- SDDCTEA Pamphlet 55-21 (Helicopter).

- SDDCTEA Pamphlet 55-22 (Lifting and Lashing).
- SDDCTEA Pamphlet 55-23 (Containerization).
- SDDCTEA Pamphlet 55-24 (FW Air Movements).
- SDDCTEA 70-1 (Better Deployability).
- SDDCTEA Pamphlet 700-2 (Strategic Mobility Planning).
- SDDCTEA Pamphlet 700-4 (Ship Loading).
- SDDCTEA 700-5 (Deployment Planning Guide).
- SDDCTEA Pamphlet 700-6 (Large Roll-on/Roll-off Ships).

A-7. Not all contingencies for unit movement can be foreseen because of the wide range of missions and world events. Units should be aware of battle book plans and wargame probable and possible scenarios. Skeleton plans should be established to cover contingencies.

A-8. Unit movement personnel familiarize themselves with the POEs available to their organization and mission requirements. Special needs and considerations are addressed as early as possible for each POE. Unit movement personnel should—

- Establish and periodically update telephone lists, points of contact, and special requirements for likely POEs.
- Conduct periodic leader's reconnaissance of POEs. Reconnaissance includes members of unit load teams and advance party personnel.
- Identify advance party personnel and define duties.
- Identify OPSEC requirements during movement and embarkation activities.
- Plan and coordinate workspace for personnel during the embarkation phase (empty offices, borrowed tentage from nondeploying units, and rented or borrowed trailers).
- Identify and prepare requests for communications requirements (commercial lines, wire, radio, and cellular phone).
- Determine transportation requirements at POE for movement teams and key personnel (borrowed vehicles and rental cars).
- Plan messing, billeting, medical treatment facilities, refueling/defueling points, and special requirements for weapons and ammunition.

DEPLOYMENT

Movement

A-9. On order, units transport their equipment and move ground vehicles along preselected routes to the POE. Units that perform depot-level maintenance normally operate at embarkation points. As the units arrive, a dedicated sustainment movement support team assists in preparing the vehicles and equipment for deployment. Preparation includes required maintenance and installation of ferry equipment.

A-10. Air and sea deployment modes terminate at the designated APOD/SPOD. Depot or ATS maintenance facilities should be available at the port or elsewhere in the theater. Personnel at these facilities assist the unit with the removal of ferried equipment, installation of mission equipment, and perform required maintenance and inspections to prepare equipment for the mission. They also coordinate the immediate backhaul of designated support teams and transfer equipment. On receipt of the order, commanders dispatch preselected facility teams. Advance party headquarters staff members locate command facilities at each termination site to facilitate the integration of vehicles and personnel into the theater force structure.

Task Organization

A-11. Arriving elements task organize and reconfigure vehicles as appropriate for the mission. Sustainment efforts are prioritized to build combat-capable units and C4I architecture.

Force Protection

A-12. ATS forces are vulnerable during the buildup phase when the unit is not at full strength and equipment or vehicles may not be fully assembled for combat. A security plan must be understood and executed; work prioritized immediately upon arrival at designated POD. This plan should include passive and active measures to combat air and ground threats.

Training

A-13. Many units that move from one environmental extreme to another need a period of adjustment to the new climate. The unit commander arranges training and conditioning to accelerate acclimation.

A-14. Most deployments involve operating in a joint or multinational environment. Early arriving units may be able to schedule training with other services. Liaison elements from the S-3 shop are designated to ensure smooth coordination.

ARMY FORCE GENERATION

A-15. To effectively manage the modular force, the Army implemented a new process of ARFORGEN. In the ARFORGEN model, units rotate through three phases of structured progression to increase unit readiness. The sequence is reset/train, ready, and available. This process retains the capability to surge combat power for major combat operations. The ARFORGEN allows commanders to identify predictable deployment windows and manage readiness and training accordingly. These windows are based on the objective cyclic rotation rates of one operational deployment for active component units every 3 years and one operational deployment for reserve component units every 6 years. The ARFORGEN process creates operational readiness cycles over time, resulting in recurring periods of availability of trained, ready, and cohesive units prepared for operational deployment in support of regional combatant commander requirements.

RESET/TRAIN

A-16. The unit mission is to reconstitute, reset equipment, assign new personnel, and train, thereby achieving the required unit capability level necessary to enter the ready force pool. The unit is capable to perform immediate defense support to civil authority missions.

READY

A-17. Units conduct mission preparation and higher level collective training with other operational headquarters for upcoming missions. Ready force pool units are eligible for sourcing, mobilization, and commitment if necessary.

AVAILABLE

A-18. Units are immediately available to conduct mission execution. Active component forces are available for immediate deployment, and reserve component forces are available for alert/mobilization/required post mobilization training and validation/deployment. Units will be sourced against operational (deployed expeditionary force packages) or contingency (contingency expeditionary force packages) requirements.

A-19. ARFORGEN task organizes units into expeditionary force packages, providing targeted resourcing for units based on known validated mission requirements. Through semiannual ARFORGEN synchronization conferences, modular-based ready, deployment, and contingency expeditionary force packages are designated and managed. Ready expeditionary forces conduct mission training and readiness activities/functions. Deployment expeditionary forces are task organized to either execute planned operational requirements or are currently executing deployed missions. Contingency expeditionary forces are remaining available force pool units that are task organized to meet operational plans and contingency requirements.

A-20. Army formations stationed at power projection installations are pooled into force packages to make expeditionary operations easier to plan and execute. Restructuring across the active and reserve components optimizes Army operating forces to the right capability packages for sustained operations.

Appendix B

Air Traffic Control Systems

Many Army ATC systems are in the process of being replaced. These newer systems add flexibility, mobility, and capability to Army ATS companies and AOBs. This modernization will ensure SA of airspace, and synchronization and interface with airspace users, by facilitating the movement and recovery of aircraft in a hostile environment or IMC weather conditions.

AIR TRAFFIC CONTROL TOWER SYSTEMS

AN/TSW-7A AIR TRAFFIC CONTROL CENTRAL

B-1. The AN/TSW-7A is a tactical ATC tower (figure B-1). This tower provides ground-to-aircraft, aircraft-to-ground, and surface communications within a designated tactical landing area or airfield. It assists in air traffic regulation; aircraft separation; in-flight assistance; and landing, takeoff, and ground control. Major components include AN/VRC-83 Have Quick radio sets, AN/VRC-92E SINCGARS radios, and one HF radio. Nine air traffic controllers are assigned to operate the AN/TSW-7A for a 24-hour period. The shelter of the AN/TSW-7A is sling-loadable by a CH-47; or can be transported by a C-17 or aircraft with similar load limits. Maintenance teams require 60 minutes during each 24-hour period. The AN/TSW-7A has limited metrological capabilities of measuring wind speed and direction, altimeter, current temperature, high and low daily temperature, and density altitude information.

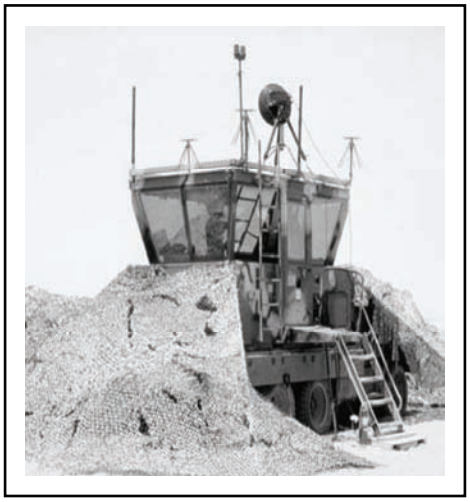

Figure B-1. AN/TSW-7A ATC central

AN/MSQ-135 MOBILE TOWER SYSTEM

B-2. The AN/MSQ-135 mobile tower system (MOTS) (figure B-2) is a modular tactical ATC tower system mounted on a an armored family of medium tactical vehicles (FMTV). The MOTS replaces the AN/TSW-7A and AN/TSQ-70A. It provides the control tower team a robust ATC tower and airfield lighting capability for the terminal airspace areas of the division and theater. The MOTS is ideal for an

airfield tower restoration mission or long-term airfield tower operations often necessary to support security and civil support operations (SACSOs). This system has digital air/ground communication and digital linkage to A2C2, ATS and local command nets, and is staffed with nine ATC operators. The AN/MSQ-135 is equipped with AN/ARC-220 HF-SSB ALE and AN/PRC-117 multiband radio sets. The AN/MSQ-135 can be airlifted by C-130 aircraft or CH-47 helicopter. The MOTS will be fielded to all components of the Army beginning fiscal year 2009.

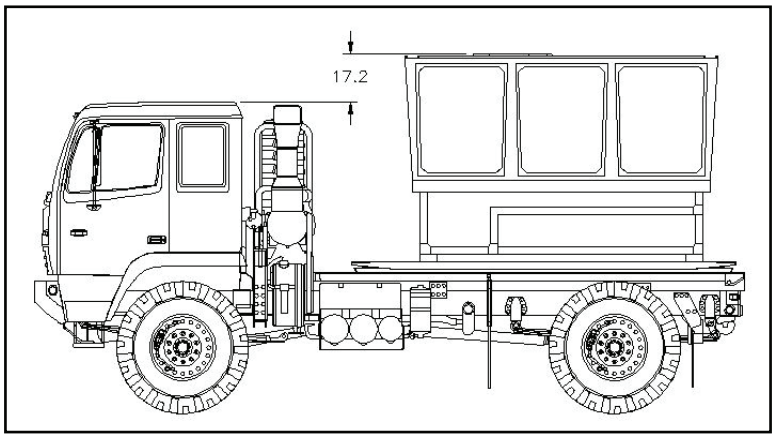

Figure B-2. Proposed AN/MSQ-135 mobile tower system

AN/TSQ-198 TACTICAL TERMINAL CONTROL SYSTEM

B-3. The AN/TSQ-198 TTCS (figure B-3) is a HMMWV-mounted ATC system for the TACT mission. The TTCS enables VFR control of air traffic at LZs, DZs, PZs, FARPs, initial airfields, and temporary helicopter operating areas. It is the system of choice for initial entry operations for localized high volume aviation operations where ATC is a risk management reducer. Four air traffic controllers are assigned to operate the AN/TSQ-198 for a 24-hour period. Major communications components include the AN/VRC-83 Have Quick radio sets, AN/VRC-90F SINCGARS, and VRC-101/PRC-138 HF radio set. The communications system can convert to a portable battery operated manpack configuration or be remoted from the vehicle up to 1 kilometer. The AN/TSQ-198 is sling-loadable by a UH-60 or similar helicopter, or can be transported by a C-130 aircraft load. The TTCS can be internally airlifted by a CH-47 if reconfigured. All TTCSs are being modified to the AN/TSQ 198A, incorporating VRC-103/PRC117 multiband radios and the AN/VRC-200 HF-SSB ALE radio integrated into a new radio set control. This modification will provide a SATCOM-DAMA capability and an improved meteorological senor. All legacy radios will be removed except for the PRC-138 radio, which will be retained for a HF manpack capability.

Figure B-3. AN/TSQ-198 TTCS

PRECISION APPROACH RADAR SYSTEMS

AN/TSQ-71B LANDING CONTROL CENTRAL

B-4. The AN/TSQ-71B GCA is a precision radar set providing course line and glide path tracking of aircraft to within 20 feet (6.1m) (altitude) and 1.3-degree runway alignment of a predetermined landing point/(touchdown. Aircraft position, as determined by GCA radar, is relayed to the pilot. An ASR capability is provided to a maximum radar range of 40 nautical miles. Major components of the AN/TSQ-71B include the shelter, AN/TPX-44 IFF interrogator antenna, AN/MJQ-15 power generation set, and AN/TPN-18 radar set (GCAs). Radio communications include UHF/VHF/FM radios. The AN/TSQ-71B interfaces with other facilities by landline or VHF/UHF/FM radios and communicates with the airfield/landing area tower facility. The AN/TSQ-71B uses analog equipment for communications and requires special consideration when interfacing with digital equipment. Seven air traffic controllers are assigned to operate the AN/TSQ-71B for a 24-hour period. The shelter of the AN/TSQ-71B is sling-loadable by a CH-47 helicopter; and can be transported by a C-141, an aircraft with similar load limits or in a dismounted configuration by a C-130 aircraft. The AN/TSQ-71B is fielded to the active Army.

AN/TPN-31 AIR TRAFFIC NAVIGATION, INTEGRATION, AND COORDINATION SYSTEM

B-5. The AN/TPN-31 (figure B-4) is currently being fielded to all components of the Army replacing the AN/TSQ-71B landing control central. It is a survivable radar system providing continuous, near all weather, precision landing and departure recovery capability at Army tactical airfields and landing areas. Additionally, this system provides area surveillance and aircraft identification capability for a 25 nautical mile radius. The system consists of three integrated radars: ASR, PAR, and secondary surveillance radar with seven air traffic controllers operating it. It can be airlifted by C-130 aircraft or sling loaded by CH-47 and is fielded to active Army and ARNG. Current fielding initiatives will replace the HMMWV configuration with an armored FMTV.

B-6. Air traffic navigation, integration, and coordination system (ATNAVICS) is a modern, fully digital, FAA compliant ATC radar, able to see better through battlefield obscurants, weather, and natural phenomena (bird flights). This system helps fill requirements stemming from vulnerabilities of GPS, battle damage to airborne systems, SACSO civil users, composite and combined nondigitized air assets, and the continuing need to have redundant ground capabilities to space-based capabilities. Its digital air picture can be used to contribute to BDZ operations, or the TAIS operations air picture, if deployed in the TAIS' vicinity.

Figure B-4. AN/TPN-31 ATNAVICS

AN/TSQ-221 TACTICAL AIRSPACE INTEGRATION SYSTEM

B-7. The AN/TSQ-221 (figure B-5) is a digital and analog system for A2C2 planning, operations, and ATS area support. It provides automation assistance to the full range of airspace planning, enhances airspace management operations (real-time), and ensures connectivity between all ATS assets and airspace users in theater. Current fielding initiatives will replace the HMMWV configuration with an armored FMTV.

Figure B-5. AN/TSQ-221 TAIS

B-8. TAIS is the direct link to tactical aviation ground support (TAGS) through interface with the JFACC's automated airspace planning and communications system. It integrates with ABCS, with direct connectivity to battlefield automated systems. It also has enhanced operability with joint, multinational, and civil C4I systems.

B-9. TAIS is a mobile system with four workstations. Communications include VHF, UHF, HF, UHF SATCOM, EPLRS, GPS, MSE/DNVT (FAX), improved data modem (+), and secure telephone unit III (phone). It maximizes synchronization of battlefield airspace supporting force operations and minimizing fratricide. Major capabilities include—

- Full integration and total synchronization of all airspace operations in the tactical commander's AO.
- Prioritized course of actions (COAs) for immediate resolution of operational airspace conflicts according to the commander's priority of airspace usage.
- Maximized opportunities for continuous operations, thereby increasing the commander's flexibility and offensive capability.
- Transparent airspace management planning and operations.
- Reduction of staff workloads and planning time.

B-10. TAIS fully integrates airspace planning methods and procedures through interface with ABCS and TAGS. Projected battle and airspace usage plans are input digitally or manually. The system correlates all information and identifies airspace usage conflicts automatically by means of preset priorities or command decision. It displays a proposed ACP with control measure graphics (in two- or three-dimension, as selected by the operator), and in the time dimension. It also produces required A2C2 orders, annexes, and overlays. It provides the capability of monitoring ACP execution over time; identifies (with alarms) and proposes resolution of actual or imminent airspace user conflict in near real-time; accepts and deconflicts real-time airspace usage changes; and automatically modifies and distributes a revised ACP (or individually modified ACMs) to update battlefield visualization.

NAVIGATIONAL AIDS

AN/TRN-30 RADIO BEACON SET

B-11. The radio beacon set transmits a homing signal that is detected by automatic direction finder equipment installed in many aircraft for navigation. The radio beacon provides an AM radio frequency signal on any one of 964 channels in frequency ranges of 200 to 535.5 and 1605 to 1750.5, tunable in 500 Hz increments. The radar frequency output is automatically keyed into four-letter Morse code characters either selected by the operator or manually keyed.

AN/TRN-30 (V) 1 Radio Beacon Set

B-12. The Pathfinder operates with both 15-foot (4.6m) and 30-foot (9.1m) antenna configurations and requires 24 volt direct current (DC) power. It also requires a cleared area of 128 feet (diameter) for ground radials and guy lines. Using a 15-foot (4.6m) antenna group, the beacon operates in a frequency range of 1605 to 1750.5 only, and transmits 28 kilometers/15 nautical miles. Operating in a 30-foot antenna configuration, it uses frequency ranges of 200 to 535.5 and 1605 to 1750.5, and transmits 46 kilometers/25 nautical miles.

AN/TRN-30 (V) 2 Radio Beacon Set

B-13. The AN/TRN-30 (V) 2 uses a 60-foot (18.3m) antenna group and requires 28 volt DC power. The two configurations used with this beacon set are tactical and semi-fixed, which require a cleared area of 170 feet (diameter) for guy lines and ground radials. The tactical configuration operates in a frequency range of 200 to 535.5, and transmits 93 kilometers/50 nautical miles. The semi-fixed mode frequency range is 200 to 535.5, and transmits 185 kilometers/100 nautical miles.

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Appendix C

Composite Risk Management

The tactical environment provides ever-changing demands and unpredictable problems, often under stressful conditions. Mission accomplishment requires continuous leader involvement and flexible decision making. Safety in the tactical environment depends on compliance with established standards. ATS units bring an added measure of safety to aviation operations. Properly used, they can mitigate or reduce many of the risks associated with these operations. Safe mission accomplishment relies heavily on the complete integration of composite risk management into the planning and execution phases of operations.

COMPOSITE RISK MANAGEMENT

D-1. Leaders at every echelon are responsible for risk management. As the Army's principal risk-reduction process, the intuitive management of risk in conducting military training and operations is old, however its' systematic application, as part of Army doctrine, is relatively new. Therefore, this section presents a summary of how-to information presented in FM 5-0, FM 100-14, and FM 3-100.12.

C-2. The risk management cycle for ATS units at all levels is tied directly to the training and maintenance process. Factors such as type of ratings, numbers of rated controllers, and equipment readiness and availability are assessed and corrections are made during normal garrison operations. Command emphasis at all levels of leadership on maintenance and supply operations eliminates many factors that might create an unacceptable risk during exercises or deployments. This assessment minimizes and mitigates many of the hazards faced during deployment. Leaders must complete the five steps for risk management listed in table C-1.

Table C-1. Steps of risk management

Step 1. Identify hazards
• Make an operational analysis. This is a description of events, in time sequence, expected to occur during the operation. • Make a preliminary hazard analysis. List the various hazards that could occur and result in accidents. It is developed using experience, the database, and scenario thinking or similar techniques. • In-depth hazard analysis. Use when time permits or when certain risks require more careful consideration.
Step 2. Assess hazards
• Assess various hazards to determine the relative probability, severity, and potential mission impact.
Step 3. Make decisions and develop controls
• Develop risk control options, starting with the most serious risks. • Complete a training realism assessment to ensure the suitability of risk controls. • Make decisions by selecting controls to reduce risk to a practical minimum constant with the mission.
Step 4. Implement controls
• Implementation is best accomplished by integrating the procedures in unit SOPs, orders, and training.

Table C-1. Steps of risk management

Step 5. Supervise
• Maintain effectiveness by ensuring risk standards are as effective as expected and kept at high levels.

C-3. The five major areas of risk assessment are fiscal, threat, tactical doctrine, physical security, and safety. Tactical units shall conduct risk assessment before a mission with each tactical facility developing its' own risk assessment (table C-2 and figure C-1, page C-3).

Table C-2. Sample tactical ATC risk assessment

1. Team Experience	***All CTO Rated***	***All Rated Mixed (CTO/ATC specialist)***	***One Or More Not position qualified***
Inexperience– (<3 Months)	3	4	5
Experience– (3 – 6 Months)	2	3	4
Experience– (>6 Months)	1	2	3
2. Allotted Mission Planning Time	***8 Hours***	***4 – 8 Hours***	***Less 4 Hours***
Complex	3	4	5
Routine–New Mission	2	3	4
Routine–Same Mission	1	2	3
3. Traffic Density	***Day***	***Night***	***NVG***
20 + A/C per hour	3	4	5
5 – 19 A/C per hour	2	3	4
Less Than 5 per hour	1	2	3
4. Weather	***Category I***	***Category II/III***	***Category IV/V***
Night IFR	3	4	5
Day IFR	2	3	4
Day/Night VFR	1	2	3
5. Operating Environment	***Garrison/EXCL Condition***	***Tactical AVG Condition***	***Tactical POOR Condition***
TAC/Unsecured	3	4	5
TAC/Secured	2	3	4
Garrison	1	2	3
6. Fighter Mgmt Rest	***On Shift 8 Hrs***	***On Shift 10 Hrs***	***On Shift 12 Hrs***
Less than 8 Hours	—	4	5
8 – 12 Hours	2	3	4
12 – 24 Hours	1	2	3
Note: Team member with the least amount of rest will be used for calculation			
7. Cumulative Fighter Mgmt Hr Worked In – Days	***0 – 2 Weeks Over 40 Hr***	***3 – 6 Weeks Over 40 Hr***	***More Than 6 Weeks Over 40 Hr***
50 +	3	4	5
40 – 49	2	3	4
Less Than 40	1	2	3
Notes: As a minimum, numbers 1, 6, and 7 shall be used in all tactical ATS risk assessments. Instructions: Under the appropriate column, circle only one value for each numbered block. Total all circled values and compare to ATS/ATC risk matrix.			

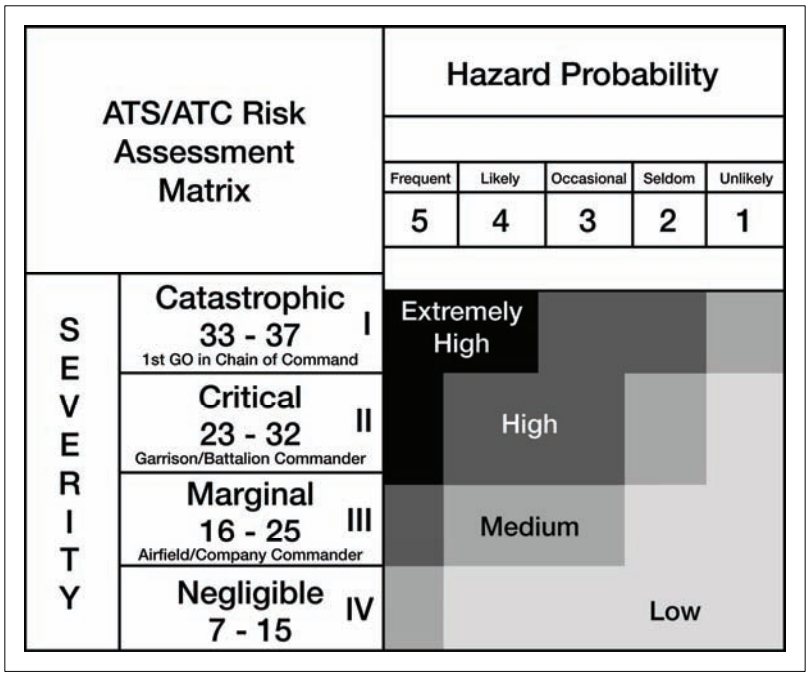

Figure C-1. Sample risk matrix

DEFINITIONS

C-4. Table C-3 defines risk management definitions.

Table C-3. Terms and definitions

Term		Definition	
Risk		Chance of hazard or adverse consequences; the probability of exposure to chance of injury or loss from a hazard; risk level is expressed in terms of hazard probability & severity.	
	Acceptable	Identified risk permitted to persist without further controls.	
	Residual	Level of risk remaining after hazard controls are selected. (Controls are identified & selected until risk is at an acceptable level or it is impractical to reduce further.)	
Levels		**The levels of risk are:**	**Probabilities of loss:**
	Extremely high	The loss of ability to accomplish the mission if hazards occur. (FM 100-14).	catastrophic or critical - frequent or likely
	High	The significant degradation of mission capabilities & the inability to accomplish all parts or complete the mission to standard if hazards occur.	catastrophic - occasional-to-seldom critical - likely-to-occasional marginal - frequent probability
	Moderate	The expected degradation of mission capabilities and the reduction in mission capability if hazards occur.	catastrophic – unlikely critical – seldom marginal - likely or occasional negligible - frequent

Table C-3. Terms and definitions

Term	Definition		
Risk	Chance of hazard or adverse consequences; the probability of exposure to chance of injury or loss from a hazard; risk level is expressed in terms of hazard probability & severity.		
Low	Expected losses have little or no impact on completing the mission.	critical- unlikely marginal - seldom or unlikely negligible - likely or less	
Risk Assessment	The identification & assessment of hazards (first two steps of risk management process).		
Risk Decision	The decision to accept the risk associated with an action made by the commander, leader, or individual responsible for performing the action.		
Conditions	The readiness status of personnel & equipment with respect to the operational environment during mission planning, preparation, & execution. Readiness below standard leads to human error, materiel failure, & inadequate precautions for environmental factors which may cause accidents, fratricide, & mission degradation.		
Controls	Actions taken to eliminate hazards or reduce their risk.		
Hazard	An actual or potential condition that can cause injury, illness, or death of personnel; damage to or loss of equipment or property; or mission degradation.		
Probability	The levels of probability that an event will occur are:		
Frequent **Likely** **Occasional**	Occurs often, continuously experienced. Occurs several times Occurs sporadically.	Seldom Unlikely	Unlikely, but could occur at some time Can assume it will not occur
Severity	The expected consequence of an event in terms of degree of injury, property damage, or other mission-impairing factors. These levels are:		
Catastrophic	Death or permanent total disability, system loss, major damage, significant property damage, or mission failure.		
Critical	Permanent partial disability, temporary total disability exceeding three months, major system damage, significant property damage, or significant mission degradation.		
Marginal	Minor injury, lost workday accident, minor system damage, minor property damage, or some mission degradation.		
Negligible	First aid or minor medical treatment, minor system impairment, or little or no impact on mission accomplishment.		
Threat	A source of danger (any opposing force, condition, source, or circumstance) with the potential to negatively impact mission accomplishment and/or degrade mission capability. Applicable only in the context of this publication and should not be referenced outside this FM.		

Appendix D
Checklists

This appendix provides a reference to information used by aviation units during training or combat. It is not all inclusive, should only be used as a guide, and not supersede unit SOPs.

CHECKLISTS

PREDEPLOYMENT AND PRE-TEMPORARY DUTY CHECKLIST

D-2. Table D-1 provides an example of a pre-deployment/pre-temporary duty checklist.

Table D-1. Example of a pre-deployment/pre-temporary duty checklist

Yes	*No*	*N/A*	*Task/Action*
Finance			
			Bills, recurring and nonrecurring.
			Bank accounts, checking, savings, loans. Investments & other income sources.
			Safety deposit boxes.
Legal			
			Power of Attorney as needed (specific, general).
			Wills updated.
			Living wills updated.
			Spouse's social security number.
			Guardianship for children.
			Insurance policies; life, auto, home/renters, floater.
			Deeds, leases, rentals, real estate documents, management company.
			Marriage or divorce papers.
			Birth certificates, adoption papers.
			School records.
			Naturalization documents.
			Vehicle titles and registration.
			Taxes.
			Necessary court documents.
Personnel Issues			
			Temporary duty or permanent change of station orders.
			Emergency data cards complete.
			Identification cards, copy, expiration dates, DEERS enrollment.
			Serviceman's Group Life Insurance.
			Passport & Visa documents.

Table D-1. Example of a pre-deployment/pre-temporary duty checklist

Yes	*No*	*N/A*	*Task/Action*
			Family care plan.
			NEO/Safe haven information.
			Personal affairs; funeral & burial instructions.
Household			
			Vehicle registration, inspection, all stickers & tags.
			Crime prevention measures/force protection information.
			Maintenance/utilities/list of who to contact for problems & repairs.
			Disaster/evacuation plan & survival kit; water, food, clothing, other necessities.
Communication			
Community contact information			
			Local emergency (police, fire, Red Cross, poison control, hospital, TRICARE).
			Post Chaplain, Army Community Services, Military Police.
			Web sites; www.afcrossroads.com, www.militaryonesource.com, etc.
Unit contact information (includes phone numbers, physical address and e-mail address)			
			Unit name, division, brigade, battalion, company.
			Command, CSM/1SG, UMT, supervisor.
			Family Readiness Group spouses.
			Orderly room, staff duty officer, filed operations division.
			Rear detachment commander/OIC & NCOIC.
			Temporary duty; dates, location.
Personal contact information			
			Family.
			Friends.
			Immediate neighbors.
			Financial.
			Insurances.
Medical			
			TRICARE enrollment/claim process.
			Locations/providers/clinic contact information.
			Records; medical, dental, shot.
Pets			
			Records.
			Veterinarian; regular & emergency.

CONVOY PRECOMBAT INSPECTION CHECKLIST

D-3. Table D-2, page D-3, provides an example of a convoy precombat inspection checklist.

Table D-2. Example of a convoy precombat inspection checklist

Items	*Completed*
Vehicles	
Vehicles are inspected at operating temperatures with hoods open.	
DA Forms 5988E are current with all parts installed.	
Vehicle fuel will be topped off.	
All basic issue items present & serviceable.	
Three days rations per Soldier per vehicle.	
Five-gallon water cans topped off.	
Water buffalo are sanitized and topped off.	
All supply trucks are covered.	
Complete combat lifesaver bag on hand (if applicable.)	
Weapons	
Crew-served weapons functionally checked.	
.50-cal headspace & timing set.	
Functions check on all individual weapons.	
DA Forms 5988E are present & current for all crew-served weapons.	
All weapons are lubricated	
Communications:	
Radios loaded with correct frequencies. Call signs recorded.	
5998Es are all current with PMCS & manual.	
Batteries for dismounted radios.	
Long-range radio checks are complete.	
Digital nonsecure voice telephones with 2 miles of WF-16 wire per phones.	
TA-1s or TA-312s are operational with 1 roll of WD-1 per set.	
Automated net control devices accounted for & loaded.	
CBRN Equipment	
DA Form 5988E are accounted.	
M-8/M-22 alarms are complete with batteries & operational alarm.	
IM-93 is accounted for & operational.	
M8 & M9 paper present & attached.	
M256A1 chemical detection kit (1 per squad) on hand.	
CBRN markers are present & stocked.	
CBRN teams identified.	
Night Observation Devices (NODs):	
DA Forms 5988E are accounted for & complete for all NODs.	
15-day supply of batteries for all NODs.	
Carrying cases are complete with accessories & lens cleaning equipment.	

Table D-2. Example of a convoy precombat inspection checklist

Items	*Completed*
Individual Solider	
Load-bearing equipment worn in accordance with tactical standing operating procedure (TACSOP) & properly fitted.	
Flack jacket is present/Gortex jacket if necessary.	
Flashlight present with the appropriate filter.	
Identification tags & identification card present.	
7 magazine per M-16/M-4; 3 per M-9 9-mm.	
DA Form 1156 in the first aid pouch & left pocket of chemical protective overgarments.	
Serviceable first aid packets.	
One-quart canteen w/cup & cover (extra canteen optional). Filled & fitted w/CBRN cap.	
All Soldiers understand the mission.	
Drivers:	
DA Forms 5988E with current PMCS & quality control with 72 hours.	
Dispatch signed by the driver & company commander/XO.	
Driver has a current unit-level support system computer-generated license.	
Driver has CSS graphics, control measures, & a map of the operational area.	
Leaders:	
Map with [illegible] graphics &/or strip map.	
Field trains TACSOP.	
Leaders have appropriate FMs & ARTEP/MTPs.	
List of all sensitive items on company standardized sensitive items sheet.	
Current list of all vehicles organic or attached.	
Current SOIs for brigade support area & task force.	
S-2 threat assessment.	
Prepared convoy commander brief.	

PRECOMBAT CHECKLIST

D-4. Table D-3 provides an example of a precombat operations checklist.

Table D-3. Example of a precombat checklist

	CHECK		*CHECK*
Individual			
Equipment packed per TACSOP direction		M8/M9 paper	
LBV complete & serviceable		Current mission-oriented protective posture (MOPP) implemented	
Ear plugs		Weapon at appropriate arming level	
First aid pouch		Optical inserts	

Table D-3. Example of a precombat checklist

	CHECK		CHECK
Ammunition pouches		Anti fogging kit	
Canteen w/water & cup		ID card	
Kevlar w/camo cover and band		ID tags (2 sets, w/2 tags, 1 set worn)	
Weapons, zero in pistol grip		MREs	
Protective mask w/carrier & hood		Drivers licenses	
Body armor as required		Challenge & password	
Flashlight w/ ies & le filters		Shot	
Causality r der reports		Hot/ ld weath b ef	
Individual decon Kit		Miss n brief	
Squad Le ar			
Personnel accounted for		MOPP level known and disseminated	
Individual preconbat inspection (PCI) completed		Weapons control	
Reference publications reviewed		Section status to platoon sergeant	
Uploaded by load plan		Situation briefed	
Expendable supplies on hand		MREs issued	
Sleep plan established		Ammo basic load issued	
Platoon Sergeant			
Personnel accounted for		Expendable supplies on hand	
Individual PCI completed		Sleep plan established	
Reference publications reviewed		Class V issued	
Uploaded by load plan		MOPP level announced	
Operation equipment		Weapons control	
Maps, updated		Platoon status to 1SG	
Compasses		Situation briefed	
Pens, etc		MREs issued	
First Sergeant			
Personnel accounted for		Camo	
Uploaded by load plan		Vehicles	
Expendable supplies on hand		Equipment	
Operation equipment		Positions	
Maps, updated		Glass & mirrors	
Compasses		MEDEVAC helipad marked	
Pens, etc		Casualty collection identified	
Individual PCI completed & verified		Reference publications reviewed	
LP/OP briefed & positioned		Early warning devises employed	
Defense plan established & rehearsed		Defensive Sector Diagram complete	
Noise & light discipline enforced		Sleep plan established	

Table D-3. Example of a precombat checklist

	CHECK		*CHECK*
Range cards verified & complete		Class V issued	
Repack all equipment not in use		Feeding plan established	
Field sanitation enforced		MOPP level known & disseminated	
Hand washing enforced		Accountability of personnel to S-1	
Trash kept policed		Accountability of sensitive items to S-3	
Reportable equipment status to battalion maintenance officer		Coordinate pick-up of equipment	
Blank re[illegible]mats		**Co[illegible]ick[illegible]p of SOI**	
Communications equipment		SINGARS	
Wire		Batteries	
Radios		Call sign board	
Microphones		Frequencies	
Antennas		Unit	
Encrypting equipment		Next higher	
SOIs		MEDEVAC	
PMCS completed		Range control	
Radios		Fire support	
Antennas		Spare equipment	
Encrypting equipment		Microphones	
TA-312s		Headsets	
Batteries		Antennas	
Wire		Batteries	
Reel handles on hand		Equipment accounted for	
Situation briefed			
CBRN Equipment			
Individual PCI complete		M256/256A1 detector kit as required	
Chemical agent alarms operational		AN/VRDR-2 Radiac sets on hand	
Chemical agent alarms employed		146 Radiac meters issued	
PMCS performed on M8 alarm		IM-93 Dosimeter issued	
M273 kit per chemical alarm		GTA warning system issued	
PBT & nerve agent antidote issued		CBRN marking kit available	
MARK I kit available		CANA kit available	
Combat Lifesavers			
Combat lifesavers bags issued		100% inventory, replenish all supplies	
Driver/Vehicle Preparation			
Loaded according to load plan		5-gallon water can	
POL products including weapons oil		5-gallon fuel can	
Tools & Rags		MREs rations stowed	

Table D-3. Example of a precombat checklist

	CHECK		*CHECK*
Vehicle hardened as required		Goggles	
Strip map on-hand		Dispatch	
Lights & markings covered		Convoy route & plan briefed	
Convoy number on vehicle		BII/AII present & serviceable	
Trailer properly hooked		First aid kit	
-10 and LO on hand		Fire extinguisher	
PMCS performed		Warning triangles	
Camo nets/poles configured/stowed		Vehicle topped off	
Vehicle Commander			
Convoy number on vehicle		-10 manual on hand	
Vehicle topped off		Extra fuel and POL	
All BII on hand		PMCS Performed	
Pioneer tools		Vehicle	
Fire extinguishers		Radios	
Grease Pencils		Note book available	
Pens/pencils available		Maps & overlays	
Sun/wind/dust goggles		Compass/GPS present serviceable	
Binoculars		Crew-served weapons	
Headspace & timing checked		Ammunition basic load	
Qualified gunner		Vehicle load plan verified	
Crew-Served Weapons			
Clean & functional		Spare barrels, cleaning kits on-hand	
Glove; bolt rupture extraction on hand		Tripod w/Triverse and elevation mechanism, bipod	
Head space & timing set (M2)		Machine guns mounted	
Function check		Test fire w/permission	
NVD, serviceable			
Generator Operator			
All BII on hand		-10 manual on hand	
Grounding rods		PMCS performed	
Fire extinguishers		Generator topped off	
Extra fuel & POL			

CHECKLIST FOR COMBAT OPERATIONS

D-5. Table D-4, page D-8, provides an example of an LZ survey checklist.

Table D-4. Example of an LZ survey checklist

Survey Date: ***LZ#:*** ***LZ Name:***

GPS Coord: ***MGRS Grid:***

Landing Area

Type: [ ] Helipad [ ] Field [ ] Bean Bag [ ] Other:

Surface: [ ] Level [ ] Sloped [ ] Rocky [ ] Dusty [ ] Wet

Wind Indicator: [ ] Wind Sock [ ] None [ ] Other:

Lighting: [ ] Chem-lite [ ] Road [ ] Inverted Y [ ] None [ ] Other:

LZ Obstacles

[ ] Towers [ ] High Grass [ ] Brush [ ]Trees [ ] Poles [ ] Buildings

[ ] Wires/Height [ ] Other:

Approach Information

LZ Long Axis:_____ (degrees magnetic) LZ Size: (meters) _____ x _____

Approach Heading: Departure Heading:

Number/Type Aircraft

UH-60 CH-47 OH-58 AH-64

Flight Route

Unaided Night Operations ***NVD Operations***

[ ] Yes [ ] No [ ] Yes [ ] No

Accessibility

[ ] Ground/Emergency Vehicles [ ] Other:

Considerations

[ ] Near Housing Area [ ] Noise Abatement [ ] Other:

Restrictions/Remarks (Out-of-ground effect, In-ground effect, Number & Type Aircraft, Day Only)

LZ Sketch/Photo (Attach to this document)

Distribution

[ ] Reading File [ ] Battalion Ops Files

Surveyor:

Risk:

[ ] Low [ ] Medium [ ] High

*** This form is intended for use at field site landing areas, not helipads***

RECONNAISSANCE WORKSHEET

D-6. Table D-5 provides an example of a reconnaissance report checklist.

Table D-5. Example of a reconnaissance report checklist

Reconnaissance Report

When Transmitted: Upon completion of zone, area, route, or obstacle reconnaissance.

LINE 1: Collection Data

a. Date/time/group (DTG) information collected:
b. DTG information received:
c. Reporting unit:

LINE 2: Data for Route Classification

a. Route name:
b. Start point:
c. Check point/release point:
d. Classification:
e. Trafficability (CODE):
f. Movement (CODE):
g. Location of critical points:

LINE 3: Data of a Bridge Classification

a. Location
b. One-way class:
c. Two-way class:
d. Overhead clearance:
e. Roadway width:
f. Bypass location:
g. Bypass (CODE):
h. Slope of entry point:
i. Slope of exit point:

LINE 4: Data for a Ford, Ferry, or a Swim Site

a. Location:
b. Current (M/SEC):
c. Maximum Depth:
d. Type Bottom (CODE):
e. Usable width:
f. Length:
g. Slope of entry bank:
h. Slope of exit bank:
i. Ferry capacity (TONS):

LINE 5: Data for Tunnel Classification

a. Location:
b. Usable width:
c. Overhead clearance:
d. Length:
e. Bypass location

Table D-5. Example of a reconnaissance report checklist

LINE 6: Obstacle Information

a. Location:
b. Slope (CODE):
c. Type (CODE):
d. Length:
e. Width:
f. Bypass Location:
g. Dimensions (6 digit grid):
1. From:
2. To:
3. To:
h. Description (Tank ditch, wire markings, antipersonnel/anti-tank mines)

LINE 7: Terrain Restrictions/Map Corrections

a. Location:
b. Movement (CODE)/What map should say:

LINE 8: Hazards to Flight

a. Obstacle height:
b. Obstacle location/length:

Report Codes

Classification

Green–All vehicles	Amber–No AVLB	Red–APC/BFV only

Trafficability

X–All weather	Y–Limited weather	Z–Fair weather

Movement

F– ast	S–Sl w

Bypass

E–Easy	D–Difficult

Type Bottom

M–Mud	C–Clay	S–Sand
G–Gravel	R–Rock	P–Paving

Slope

A–Less than 7%	C–10-14%
B–7-10%	D–Over 14%

Type Obstacle (If CBRN, use white 1 or green 6 formats)

AB–Abatis	MF–Minefield	RF–Rockfall or rockslide	TD–Tank ditch
CH–Chemical	N–Radiological	O–Other	RB–Roadblock

Details on items encountered during reconnaissance are reported as encountered if time sensitive.

Submit overlays to the S-2 at conclusion of reconnaissance.

S-2 consolidates details of terrain features and submits them to higher at conclusion of reconnaissance.

AIR TRAFFIC CONTROL HANDOVER CHECKLIST

D-7. Table D-6 provides an example of an ATC handover checklist:

Table D-6. Example of an ATC handover checklist

1. Airfield Name: _____
2. Airfield Location: _____
LAT/LONG: _____/_____
3. ICAO Identifier: _____
4. Airfield Frequencies: **(P) UHF/VHF (S) UHF/VHF**
ATIS _____/_____ _____/_____
Approach Control _____/_____ _____/_____
Tower Control _____/_____ _____/_____
Ground Control _____/_____ _____/_____
Clearance Delivery _____/_____ _____/_____
Base Operations _____/_____ _____/_____
SAR _____/_____ _____/_____
WX Metro _____/_____ _____/_____
5. Airfield Diagram:
6. Usable Runways: _____/_____/_____/_____/_____/_____
7. Usable Taxiways: _____/_____/_____/_____/_____/_____
8. Dimensions:

Length	Width	Composition	PCN
Runway			
Taxiway			
Helipad			
AV-8B Pad			

9. Traffic Pattern:

Entry Point	Altitude	Point of Descent
Left		
Right		
Straight-in		

Table D-6. Example of an ATC handover checklist

Overhead _____ _____ _____

Other _____ _____ _____

10. Pattern Altitude:

Turbo-Jet _____

Propeller-Driven _____

Helicopter _____

Altitude Remarks:

_____

_____

_____

11. NAVAID**: Location / Frequency / Power Source (Lat/Long)**

NDB _____/_____/_____

VOR _____/_____/_____

TACAN _____/_____/_____

VORTAC _____/_____/_____

MLS _____/_____/_____

ILS _____/_____/_____

GPS _____/_____/_____

VASI _____/_____/_____

ASR _____/_____/_____

PAR _____/_____/_____

12. Hot Cargo Area: **Y___ N___ Location** _____

13. Refueling Points: **Y___ N___ Location** _____

14. Arming/De-arming Area: **Y___ N___ Location** _____

15. Parking Locations/Spots/Restrictions:

FW _____

_____

Rotary Wing _____

_____

VIP/VAL_____

_____

16. Obstacles on Airfield: **Y___ N___**

Trees	Y___ N___ _____Ft		Wires	Y___ N___ _____Ft	
Houses	Y___ N___ _____Ft		Personnel	Y___ N___ _____Ft	
Ditches	Y___ N___ _____Ft		Terrain	Y___ N___ _____Ft	
Poles	Y___ N___ _____Ft				

17. Blind Spots:

Visual _____

Radio _____

18. Non-Radar Procedures:

Heading _____

Handoff Time _____

Table D-6. Example of an ATC handover checklist

Fix _____

Altitude _____

Frequency _____

Location _____

19. TERPs: **Y ___ N ___**

20. Reporting Points: **#1 #2 #3 #4**

Location _____ _____ _____ _____

Altitude _____ _____ _____ _____

21. Holding Points VFR:

Location _____ _____ _____ _____

Altitude _____ _____ _____ _____

Pattern _____ _____ _____ _____

22. Holding Points IFR:

Location _____ _____ _____ _____

Altitude _____ _____ _____ _____

Pattern _____ _____ _____ _____

23. Bailout Area:

Location _____ _____ _____ _____

Altitude _____ _____ _____ _____

24. Jettison Area:

Location _____ _____ _____ _____

Altitude _____ _____ _____ _____

25. Fuel Dump Area:

Location _____ _____ _____ _____

Altitude _____ _____ _____ _____

26. Alternate/Divert Airfields Information:

Name	NAVAID channel	Heading from ALFD	Dist (nm)	Elev	Fuel	Longest Runway	Approach Freq	TWR Freq	Navaid

27. Weather:

Wind: Prevailing _____/_____ Surface _____/_____

VSBY _____Mi

Ice Y___ N___

Wet Y___ N___ Rain/Snow

Breaking Action

Good___ Fair___ Poor___ NIL___ UNK ___

Table D-6. Example of an ATC handover checklist

Other:_____

_____

Remarks:

_____

_____

_____

TABLES

AVERAGE MARCH RATES FOR MIXED COLUMNS

D-8. Table D-7 provides the estimated speed march rates units can attain under certain driving and road conditions. Planners adjust these rates given individual driver training, experience, and physical conditioning.

Table D-7. Average march rates for mixed columns (in kilometers)

Condition	*March Rates*
Day, on roads	20 to 30
Night, on roads	15 to 20
Cross-country	5 to 15

AVERAGE VEHICLE SPEEDS

D-9. Table D-8 provides the planner an indication of average speeds attainable given a surface composition and degree of surface destruction.

Table D-8. Average vehicles speed (kilometers per hour)

Road Type	*Undamaged Surface*	*10% Surface Destruction*	*<10% Surface Destruction*
Concrete, asphalt	40 to 50	20 to 35	10 to 20
Gravel & rubble	40 to 50	20 to 30	10 to 20
Dirt	15 to 25	8 to 15	5 to 10

TIME DISTANCE RATES

D-10. Table D-9 and table D-10 reflect time distance rates in kilometers and miles, respectively.

Table D-9. Time distance rates (kilometers)

Speed	*Distance*				
	1 km	*2 km*	*3 km*	*5 km*	*10 km*
10 kph/6.2 mph	6 min	12 min	18 min	30 min	60 min
15 kph/9.4 mph	4 min	8 min	12 min	20 min	40 min
20 kph/12.5 mph	3 min	6 min	9 min	15 min	30 min
25 kph/15.6 mph	2.4 min	4.8 min	7.2 min	12 min	24 min
30 kph/18.7 mph	2 min	4 min	6 min	10 min	20 min
35 kph/22 mph	1.7 min	3.4 min	5.1 min	8.5 min	17 min
40 kph/25 mph	1.5 min	3 min	4.5 min	7.5 min	15 min

Table D-9. Time distance rates (kilometers)

48 kph/30 mph	1.2 min	2.4 min	3.6 min	6 min	12 min
56 kph/35 mph	1 min	2 min	3 min	5 min	10 min
64 kph/40 mph	.9 min	1.8 min	3.6 min	4.5 min	9 min
72 kph/45 mph	.8 min	1.6 min	2.4 min	4 min	8 min

Table D-10. Time distance rates (miles)

Speed	***Distance***				
	1 mile	***2 mile***	***3 mile***	***5 mile***	***10 mile***
5 mph/8 kph	12 min	24 min	36 min	60 min	120 min
10 mph/16 kph	6 min	12 min	18 min	30 min	60 min
15 mph/24 kph	4 min	8 min	12 min	20 min	40 min
20 mph/32 kph	3 min	4 min	9 min	15 min	30 min
25 mph/40 kph	2.4 min	4.8 min	7.2 min	12 min	24 min
30 mph/48 kph	2 min	4 min	6 min	10 min	20 min
35 mph/56 kph	1.7 min	3.4 min	5.1 min	8.5 min	17 min
40 k mph/64 kph	1.5 min	3 min	4.5 min	7.5 min	15 min
45 mph/72 kph	1.3 min	2.6 min	3.9 min	6.5 min	13 min

Note: When converting miles to kilometers: (miles x 1.609 = kilometers) or (miles/621 = kilometers). Example: 12 miles x 1.609 = 19.3 kilometers. When converting kilometers to miles: (kilometers x 0.621 = miles) or (kilometers/1.609 = miles). Example: 20 kilometers x 0.621 = 12.4 miles.

REPORTS AND FORMATS

SPOT REPORT

D-11. Spot reports (SPOTREPs) are used to send timely intelligence or status information regarding events that could have an immediate and significant effect on current planning and operations (table D-11).

Table D-11. SPOTREP

Line 1	Date and time group of report.
Line 2	Unit making report.
Line 3	Size of enemy unit.
Line 4	Activity of enemy at DTG or report.
Line 5	Location of enemy activity or event observed.
Line 6	Unit, (enemy unit).
Line 7	Time of observation.
Line 8	Equipment of unit observed.
LINE 9	Sender's assessment of activity.
Line 10	Narrative of action taken by friendly forces.
Line 11	Report authentication.
Line 12	Distribution of report.

CONVOY STATUS REPORT

D-12. Table D-12 provides an example of a convoy status report. This report is used to update convoy SPs, stops en route, and release points (RPs).

Table D-12. Convoy status report

Line 1	DTG.
Line 2	Unit making report.
Line 3	Convoy commander.
Line 4	Convoy unit number.
Line 5	Number of wheeled vehicles.
Line 6	Number of personnel.
Line 7	Route being used and alternate proposed.
Line 8	Starting point, include first vehicle to DTG and last vehicle DTG.
Line 9	Resting points. a. DTG of arrival and departure at/from resting point. b. Number of vehicles arrived and number of vehicles departing. c. Number of personnel arrived and number of personnel departing.
Line 10	RP including DTG of first vehicle to cross and last vehicle to cross RP.
Line 11	CP.
Line 12	Convoy closing DTG.
Line 13	Accidents/breakdowns. a. Type/bumper number/unit of broken down vehicles/equipment. b. Location or broken vehicles/equipment. c. Estimated time to continue operations.
Line 14	Sensitive items status.
Line 15	Narrative/remarks.
Line 16	Authentication.

WEATHER ADVISORY/WATCH (WEATHER WATCH) REPORT

E-1. The weather advisory/watch (weather watch) report in table D-13 is used to send flash weather information affecting current unit operations.

Table D-13. Weather advisory/watch (weather watch) report

Line 1	DTG.
Line 2	Unit making report.
Line 3	Report line.
Line 4	Summary of warning.
Line 5	Time of watch (DTG from-to DTG as of DTG of watch).
Line 6	Area effected.
Line 7	Narrative/remarks, free text for additional information required for clarification of report.
Line 8	Report authentication.

RAIL LOAD STATUS REPORT

D-13. The rail load status report is used to update upload and download status (table D-14).

Table D-14. Rail load status report

Unit making the report.	
DTG of report.	
Line 1	DTG loading or off loading began.
Line 2	DTG loading or off loading completed.
Line 3	Loading or off loading railhead commander.
Line 4	Loading or off loading railhead location.
Line 5	Number of wheeled vehicles loaded or off loaded.
Line 6	Other cargo loaded or off loaded (specify).
Line 7	Number of passengers by grade including train guards.
Line 8	Estimated pull or arrival DTG.
Line 9	Rail destination.
Line 10	Remarks.

CLOSURE REPORT

D-14. The closure report is used to inform the commander of unit movement and its capability to conduct future operations (table D-15). This report is submitted upon movement completion or as directed by the commander.

Table D-15. Closure report

Line 1	DTG.
Line 2	Unit making report.
Line 3	SP grid point and DTG.
Line 4	RP grid point and DTG.
Line 5	Command post location.
Line 6	Closing DTG.
Line 7	Accidents/incidents/enemy activity encountered.
Line 8	Estimated time unit will be reconstituted and ready to continue operations.
Line 9	Sensitive items status, include detailed lost items report and action being taken.
Line 10	Remarks.
Line 11	Report authentication.

PERSONNEL DAILY SUMMARY REPORT

D-15. The personnel daily summary (PDS) report gives an overall view of personnel strengths as well as changes to personnel strengths from the previous report (table D-16). A consolidated crew status of major weapons systems within the major subordinate command is also reported. It covers a 12-hour time period, is cumulative, and is submitted twice daily.

Table D-16. Personnel daily summary report

Required information
Consolidated strength
Required strength, required strength on MTOE.
Previous strength, strength reported from last PDS.
Replacements, replacement Soldiers from higher HQ.
RTD/ATCH (returned to duty Soldiers).
KIA/WIA/MIA (killed/wounded/missing in action).
DNBI (disease/non-battle injury).
ADMIN (administrative losses).
Current strength, previous strength + gains – losses.
Required and assigned strength by MOS and grade.
Junior grade officers (O1-O3).
Warrant officers (W1-W4).
Senior enlisted (E7-E9).
Junior NCOs (E5-E6).
Junior enlisted (E1-E4).
Significant remarks to explain drastic strength changes.

MAJOR SUBORDINATE COMMAND/ UNIT REPORTING

D-16. The major subordinate command/unit report is used to inform higher headquarters of CBRN threats or attacks occurring in the last 12 hours and the reporting unit's defensive posture (table D-17).

Table D-17. Major subordinate command/unit reporting

Unit sending report:	
Line 1	DTG of report.
Line 2	Unit threat condition report.
Line 3	Unit minimum MOPP level(s).
Line 4	Unit radiation status.
Line 5	Enemy strikes reported in the past twelve hours: a. DTG of attack. b. Location of attack. c. Means of delivery. d. Agent type. e. Remarks.
Line 6	Smoke, decon, recon mission conducted in last 12 hours.
Line 7	Remarks.

MEACONING, INTRUSION, JAMMING, INTERFERENCE REPORT

D-17. The meaconing, intrusion, jamming and interference report is submitted when units experience enemy attempts to jam, interfere, or disrupt radio communications (table D-18).

Table D-18. Meaconing, intrusion, jamming, interference report

Type:

Meaconing.

Intrusion.

Jamming.

Interference.

Affected stations (call signs):

Location(s):

Frequency:

Type of equipment affected:

Type of interference:

Strength of interference:

Date and time interference: ***Begin:*** ***End:***

Remarks:

MEDICAL EVACUATION 9-LINE REQUEST

D-18. The medical evacuation 9-line request is used when requesting ambulance support (air and ground) (table D-19).

Table D-19. Medical evacuation 9-line request

Line 1 Location of pickup site (full grid, 34T EN43532501):

Line 2 Frequency/call sign at pickup site (30.75 is mandatory): 30.750/

Line 3 Number of patients by precedence:

Urgent: To save life, limb, or eyesight within two hours; evacuate within 2 hours.

Urgent surgical: Must receive surgical care within 2 hours.

Priority: Evacuate within 4 hours.

Routine: Evacuate within 24 hours.

Convenience: Evacuate at medical convenience.

Line 4 Special equipment (circle if needed):

None.

Hoist.

Extraction equipment.

Ventilator.

Line 5 Number of patients by type:

L: Number of litter patients.

A: Number of ambulatory patients.

Line 6 Security of pickup site (wartime):

N: No enemy troops.

P: Possible enemy troops.

E: Enemy troops in area (caution).

X: Enemy troops in area (armed escort required).

Table D-19. Medical evacuation 9-line request

In peacetime, number and types of wounds, injuries, and illnesses.

Line 7 Method of marking pickup site:

Panels.

Pyrotechnics.

Smoke signals.

None.

Other:

Line 8 Patient nationality and status:

United States military.

United States civilian.

Non-United States military, specify:

Non-United States civilian, specify:

EPW, nationality:

Line 9 PZ status:

CBRN (wartime).

Terrain description (peacetime).

UNEXPLODED ORDINANCE REPORT

D-19. The unexploded ordinance report notes the presence of unexploded ordinance and requests EOD assistance to neutralize/remove the ordinance (table D-20).

Table D-20. Unexploded ordinance report

Line 1	DTG item was discovered.
Line 2	Reporting unit and location (grid or directions from landmark).
Line 3	Contact method between witness and responding EOD team (radio frequency, call sign, point of contact, phone number, meeting place, etc.).
Line 4	Type of ordnance (dropped, placed, projected, or thrown). Give short description of item and quantity, if more than one.
Line 5	NBC contamination in the area. Be as specific as possible.
Line 6	Resources threatened. Facilities, routes, etc.
Line 7	Impact on mission. How threat from the UXO affects the mission.
Line 8	Protective measures taken to protect personnel or equipment.
Line 9	Recommended priority for response by EOD technicians.

Priorities:

- Immediate–UXO stops unit maneuver and mission capability or threatens critical assets vital to the mission.
- Indirect–UXO slows maneuver or mission capability or threatens critical assets important to the mission.
- Minor–UXO reduces unit maneuver and mission capability or threatens non-critical assets of value.
- No Threat–UXO has little or no affect on unit mission or assets.

Glossary

1SG	first sergeant
A&L	administrative and logistics
A2C2	Army airspace command and control
AA	assembly area
AAR	after-action review
ABCS	Army battle command system
ACM	airspace coordination measure
ACO	air control order
ACP	airspace control plan
AD	air defense
ADAM	air defense and airspace managment
AGS	aviation ground support
AIC	airspace information center
AIS	airspace information service
AKO	Army Knowledge Online
ALE	automatic link establishment
AM	amlpitude modulated
AMCOM	Aviation and Missile Command
AMD	area missile defense
AMTP	air traffic services maintenance training program
AO	area of operation
AOB	airfield operations battalion
AOR	area of responsibility
APG	aviation procedures guide
APOD	aerial port of debarkation
APOE	aerial port of embarkation
AR	Army regulation
ARFORGEN	Army force generation
ARNG	Army National Guard
ARTEP	Army training and evaluation program
ASCC	Army Service Component Command
ASR	airport surveillance radar
AT&A	air traffic and airspace
ATASM	air traffic and airspace management technician
ATC	air traffic control
ATNAVICS	air traffic navigation, integration, and coordination system
ATO	air tasking order
ATS	air traffic services

ATSCOM	Air Traffic Services Command
ATSSE	air traffic services standardization element
ATTP	air traffic training program
BAE	brigade aviation element
BAS	battlefield automated system
BDOC	base defense operations center
BDZ	base defense zone
BFT	Blue Force Tracker
C2	command and control
C3	command, control, and communications
C4I	command, control, communications, computers, and intelligence
CAB	combat aviation brigade
CAI	completed accident investigation
CALL	Center for Army Lessons Learned
CATS	combined arms training strategies
CBRN	chemical, biological, radiological, and nuclear
CECOM	Communications-Electronics Command
CFSR	civilian field service representative
COA	course of action
COM/WIRE	communication/wire
COMNAV	communication/navigation
COMSEC	communications security
CONPLAN	concept plan
CONUS	continental United States
COP	commom operating picture
CP	command post
CRAF	Civil Reserve Air Fleet
CRE	contingency response element
CRG	contingency response group
CRW	contingency response wing
CSM	command sergeant major
CSS	combat service support
CTL	commander's task list
CTO	control tower operator
DA	Department of the Army
DA Pam	Department of the Army pamphlet
DAMA	demand assigned multiple access
DATCALS	deployable air traffic control and landing system
DC	direct current
DNVT	digital nonsecure voice telephone

DOD	Department of Defense
DS	direct support
DSN	defense switch network
DSVT	digital secure voice telephone
DTD	data transfer device
DTG	date/time/group
ECO	environmental compliance officer
EPLRS	enhanced position location reporting system
FAA	Federal Aviation Administration
FAAH	Federal Aviation Administration Handbook
FAAO	Federal Aviation Administration Order
FARP	forward arming and refueling point
FBCB2	Force XXI Battle Command Brigade and Below
FLIP	flight information publication
FLOT	forward line of own troops
FM	field manual, frequency modulated
FMTV	family of medium tactical vehicles
FOB	forward operating base
FOD	foreign object damage
FSCM	fire support coordinating measure
FW	fixed-wing
GCA	ground control approach
GPS	global positioning system
GS	general support
GSAB	general support aviation battalion
HAA	heavy assembly area
HF	high frequency
HHC	headquarters and headquaters company
HMMWV	high mobility multi-purpose wheeled vehicle
HSS	health support service
IAI	initial accident investigation
ICAO	International Civil Aviation Organization
IED	improvised explosive device
IFF	identification friend or foe
IFR	instrument flight rule
IIMC	inadvertent instrument meteorological condition
IMC	instrument meteorological condition
INC	internet controller
INFOSEC	information security
IPB	intelligence preparation of the battlefield

ISB	intermediate staging base
JFACC	joint force air component commander
JFC	joint force commander
JIIM	joint, interagency, indepartmental, and multinational
JNN	joint network node
JNTC	joint network tactical capability
JOA	joint operations area
kbps	kilobits per second
LAN	local area network
LAO	logistic assistant officer
LAP	logistics assistant program
LIC	low intensity conflict
LOA	letter of agreement
LOP	letter of procedure
LOS	line of sight
LP	listening post
LSA	logistics support area
LZ	landing zone
MATCD	Martine Air Traffic Control Detachment
MEDEVAC	medical evacuation
METL	mission essential task list
METOC	meteorologic and oceanographic
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, and civil considerations
MOPP	mission-oriented protective posture
MOS	military occupational specialty
MOTS	mobile tower system
MRE	meal ready-to-eat
MSE	mobile subscriber equipment
MST	mission support team
MTOE	modified table of organization and equipment
MTP	mission training plan
NAVAID	navigational aid
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NDB	nondirectional beacon
NIPR	nonsecure internet protocol router
NIPRNET	unclassified but sensitive protocol routing system
NLOS	non-line of sight
NOD	night observation device

NOE	nap-of-the-earth
NOTAM	notice to airman
NVD	night vision device
O&I	operations and intelligence
OCONUS	outside the continental United States
OEM	original equipment manufacturer
OL	operations letter
OP	observation post
OPCON	operational control
OPLAN	operational plan
OPORD	operating order
OPSEC	operations security
PAR	precision approach radar
PBL	performance-based logistics
PCI	precombat inspection
PDS	personnel daily summary
PMCS	preventive maintenance checks and services
POD	port of debarkation
POE	port of embarkation
POL	petroleum, oil, and lubricants
PZ	pickup zone
QRF	quick reaction force
RAA	rear assembly area
RL	readiness level
ROE	rules of engagement
ROZ	restricted operations zone
RP	release point
RSOI	reception, staging, onward movement, and integration
S-1	adjutant
S-2	intelligence officer
S-3	operations officer
S-4	logistics officer
S-6	communication-electronics officer
SA	situational awareness
SACSO	security and civil support operation
SATCOM	satellite communication
SDDCTEA	Surface Deployment and Distribution Command Transportation Engineering Agency
SINCGARS	single-channel ground and airborne radio system
SINCGARS-SIP	single-channel ground and airborne radio system-system improvement program

SIPR	secure internet protocol router
SIPRNET	secure internet protocol router network
SO	safety officer
SOF	special operations force
SOI	signal operator instruction
SOP	standing operating procedure
SOR	source of repair
SP	start point
SPINS	special instructions
SPOD	seaport of debarkation
SPOE	seaport of embarkation
SPOTREP	spot report
SSB	single side band
STAMIS	standard Army management information systems
SU	situational understanding
TAA	tactical assembly area
TAC	Theater Aviation Command
TACOM	Tank-Automotive and Armaments Command
TACSOP	tactical standing operating procedure
TACT	tactical aviation control team
TADIL	tactical digital information link
TAGS	tactical aviation ground support
TAIS	tactical airspace integration system
TAOG	Theater Airfield Operations Group
TB	technical bulletin
TC	training circular
TDA	table of distribution and allowances
TDMA	time division multiple access
TEK	transmission encryption key
TERP	terminal instrument procedure
TI	tactical internet
TM	technical manual
TMDE	test, measurement, and diagnostic equipment
TOC	tactical operations center
TRI-TAC	triservice tactical communication
TSC	Theater Support Command
TTCS	tactical terminal control system
UAS	unmanned aircraft system
UHF	ultra high frequency
UMO	unit movement officer

UMT	unit ministry team
USAASA	United States Army Aeronautical Services Agency
USACRC	United States Army Combat Readiness Center
USAMC	United States Army Materiel Command
USR	unit status report
UXO	unexploded ordinance
VBIED	vehicle-borne improvised explosive device
VFR	visual flight rule
VHF	very high frequency
VIP	very important person
VMC	visual meteorological condition
VoIP	voice over internet protocol
WAN	wide area network
WARCO	warranty claims officer
WARNO	warning order
WIN-T	warfighter information network-tactical
XO	executive officer

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SDDCTEA Pamphlet 55-19. Tiedown Handbook for Rail Movements. September 2003.

SDDCTEA Pamphlet 55-20. Tiedown Handbook for Truck Movements. July 2001.

SDDCTEA Pamphlet 55-21. Lifting and Tiedown Handbook for Helicopter Movements. June 2002.

SDDCTEA Pamphlet 55-22. Lifting and Lashing Handbook for Marine Movements. August 2005.

SDDCTEA Pamphlet 55-23. Tiedown Handbook for Containerized Movements. September 2003.

SDDCTEA Pamphlet 55-24. FW Air Movements.

SDDCTEA 70-1. Transportability for Better Deployability.

SDDCTEA Pamphlet 700-2. Logistics Handbook for Strategic Mobility Planning.

SDDCTEA Pamphlet 700-4. Vessel Characteristics for Ship Loading.

SDDCTEA 700-5. Deployment Planning Guide.

SDDCTEA Pamphlet 700-6. Large, Medium-Speed Roll-on/Roll-off Ships Users' Manual.

Unit movement officer deployment handbook. This handbook can be downloaded at <http://www.transchool.eustis.army.mil/UMOD/Guide/>.

DOCUMENTS NEEDED—NONE

READING RECOMMENDED

Website	*Link*	*Use*
Company commanders	http://companycommand.army.mil	For current company commanders as an information sharing medium
Reimer Digital Library	http://www.train.army.mil	Used to access military publications
Defense Technical Information Center	http://www.dtic.mil	
Joint Electronic Library	http://www.dtic.mil/doctrine	
Quad A Homepage	http://www.quad-a.org	
Active FM–Army Doctrine and Training Publications	http://www.army.mil/usapa/doctrine	
Air War College References, Online and Off	http://www.au.af.mil	
AKO/Army Homepage	http://www.army.mil	Used by military personnel and authorized civilians to access e-mail, publications, current events, other military organizations, & special project groups
Army Publishing Directorate Home Page	http//www.apd.army.mil	
Association of the United States Army	http://www.ausa.org	
Center for Army Lessons Learned Public Web Page	http://call.army.mil/	Used to gather & provide information on lessons learned during military operations. Information is available for download. Provisions are established for special requests.
Defend America–United States Defense Dept. War on Terror 07-13-2004–Edition 3.	http://www.defendamerica.mil	
Fort Rucker–The Home of Army Aviation.	http://www-rucker.army.mil	Provides data about Fort Rucker, Army aviation, units & directorates, current events, & points of contact
Military.com.	http://www.military.com	
Quoteland.com.	http://www.quoteland.com	Quotations on every topic, by every author, & in every fashion possible.
TRADOC Homepage.	http://www.monroe.army.mil	
Army Warrant Officer Career Center.	http://usawocc.army.mil/	

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16 February 2007

By order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
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